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i-FRAME – Assessing impacts of social policy innovation in the EU

Proposed methodological framework to evaluate socio-economic returns on investment of social policy innovations

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This report is based on the results of the IESI Project conducted under the Administrative arrangement between JRC and DG EMPL (№ 33268-2014-01) for a multi-year research on 'ICT Enabled Social Innovation to support the implementation of the EU Social Investment Package' – https://ec.europa.eu/jrc/en/iesi

Title: i-FRAME – Assessing impacts of social policy innovation in the EU: Proposed methodological framework to evaluate socio-economic returns on investment of social policy innovations

Abstract
This report presents the final proposal for developing a methodological framework to assess the impacts generated by social policy innovations which promote social investment in the EU, in short i-FRAME. This framework has the objective to provide a structured approach that shall serve as a comprehensive framework for conducting analysis of the economic and social returns on investments of social policy innovations. It also aims to act as a guide to gather insights into replicability and transferability of initiatives which promote social investment across the EU. The report outlines the reviewed and improved theoretical and methodological approach developed by the JRC with help from external experts, and validated by testing the operational components proposed on a number of case studies and scenarios of use. After outlining the conceptual and methodological approach underpinning the i-FRAME (V1.0), the report discusses the proposal for building its operational components according to a structured theoretical framework of a dynamic simulation model for social impact assessment (V1.5). The final proposal for i-FRAME (V2.0) and an overview of the operational components for its implementation are then presented discussing the key elements that should be developed to build a comprehensive i-FRAME Web-Platform and simulator for social impact assessment. Conclusions are then offered in terms of implications for policy and directions for future research. These were drawn after consulting experts from different research disciplines, practitioners and representatives of relevant stakeholders and policymakers, and they include .recommendations for further developing the operational components proposed, paving the way towards building the i-FRAME (V3.0) and beyond.

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Acknowledgements

This report is one of the outcomes of the research on 'ICT-Enabled Social Innovation to support the implementation of the Social Investment Package' (IESI), conducted, by the European Commission's Joint Research Centre in collaboration with DG Employment, Social Affairs and Inclusion (DG EMPL) between 2014 and 2016.

The report has been elaborated under the scientific leadership of Gianluca Misuraca, by the IESI Team which was part of the Information Society Unit of the Institute for Prospective Technological Studies (IPTS), and now within the JRC Directorate for Growth and Innovation.

However, it is the result of extensive collaboration, as it incorporates the findings of different support studies conducted by external contractors under the supervision of JRC. It also integrates inputs received by many experts who acted as reviewers or participated in various consultation workshops.

Therefore, we are grateful to all the experts and researchers that provided support to the conceptualisation, design, testing and validation of the i-FRAME proposal, and we hope to cooperate further with each of them in the future.

In particular, we are thankful to Karl Richter and the teams of EngagedX and the University of Kent for supporting in reviewing the state of the art of social impact assessment and to contribute to the development of the i-FRAME V1.0 in the preliminary exploratory phase of the research over the course of 2015. We are also thankful for the work carried out by the Fair Dynamics research team, under the scientific coordination of Luigi Geppert. This team produced a study which developed a proposal for an operational framework to assess the impacts generated by ICT-enabled social innovation initiatives which promote social investment in the EU (i-FRAME V1.5). This study, conducted during 2016, allowed the JRC to test a number of operational approaches to simulation modelling with contributions from external experts, including Prof. Pal Davidsen of the University of Bergen, and Douglas McKelvie from the Symmetric Partnership, UK.

The current final proposal for the development of i-FRAME V2.0, includes the preliminary results of the support study carried out by a consortium composed of Open Evidence, Ernst & Young and the Sant'Anna School of Advanced Studies and led by Cristiano Codagnone (State University Milan), Francisco Lupianez-Villanueva (Open University of Catalonia), and Andrea Roventini from the Sant'Anna School of Advanced Studies in Pisa.

The final proposal for the development of i-FRAME also builds on comments and suggestions from independent external reviewers on intermediate pieces of the research. Special thanks go to Gwendolyn Carpenter of the Danish Technological Institute (DTI), and Simona Milio of the London School of Economics (LSE), who reviewed the first proposal for i-FRAME (V1.0); to Mehtap Agkuc, of the Centre for European policy Studies (CEPS) and Bruce Edmonds, Director of the Centre for Policy Modelling at the Manchester Metropolitan University and Petra Ahrweiler, Director of the European Academy of Technology and Innovation Assessment, who reviewed the version 1.5 of the i-FRAME proposal and provided comments for the version 2.0.

Furthermore, the development and validation of the i-FRAME benefited from inputs from participants in various events where it was presented and discussed. More specifically, we would like to thank all the experts and representatives of stakeholders who attended the IESI Experts and Stakeholders Workshops (Brussels on 4th November 2014 and 24-25 February 2015 and Seville in 2016 on 7-8 July, 6th April and 25th October), the Final IESI Conference (Brussels, 14-15 March 2017), and several other policy events. At these events, the i-FRAME was discussed with practitioners, policymakers and researchers from various disciplines. Their valuable insights and suggestions have inspired the development of the i-FRAME to date, and will be taken into consideration to set the future research directions.

Finally, we are indebted to our colleagues of DG EMPL for their continuous guidance throughout the 'co-development' of the proposal for the i-FRAME since its inception in 2014.

Executive Summary

This report presents the **final proposal for developing a methodological framework to assess the impacts generated by Social Policy Innovations which promote social investment in the EU – i-FRAME**. This framework has two objectives:

1. To provide a structured approach to the analysis of initiatives collected through mapping social policy innovations in the EU.
2. To serve as a comprehensive framework for conducting analysis of the economic and social returns on investments of social policy innovations.

In doing so, it aims to act as a guide to in-depth analysis to gather insights into replicability and transferability of initiatives which promote social investment across EU Member States.

The conceptual framework and methodological approach underpinning the i-FRAME was outlined by the JRC in 2015 and further described in the proposal for **i-FRAME (V1.0)**. This was then further elaborated and tested with support from external experts, by applying it to selected scenarios of use drawn from case studies carried out across the EU. This allowed the JRC to develop a proposal for a theoretical and methodological approach to building the operational components of the **i-FRAME (V1.5)** according to a structured theoretical framework of a simulation model for social impact assessment.

The final proposal for developing **i-FRAME (V2.0)** outlines a reviewed and improved theoretical and methodological approach. It aims to develop a comprehensive framework for evaluating the social and economic impacts of **social policy innovations promoting social investment**, **where ICTs play an important role**. In this respect, whereas **social investment** captures the *'congeries of ideas about the objectives, areas of intervention and instruments'*, **social innovation** *'represents the enablers and drivers for social change, more equal economic development and possible shared prosperity'*. Social innovation can improve the efficiency of social policies and their effectiveness in addressing societal challenges and facilitate life-long investment in human capital.

However, evidence to inform decisions is often limited or produced too late, thus becoming ineffective, or insufficient to support policy-making in a structured manner. The limits of traditional approaches are even more evident in the case of social innovation, as the concept itself is ill-defined and difficult to measure. The review of the state of the art thus pointed to the **need to define a methodological approach and develop a meta-framework capable of assessing the social and economic returns of initiatives promoting social investments**. This need is even more pressing when it comes to assessing impacts generated by initiatives that address complex phenomena such as innovations in social policy and social services delivery.

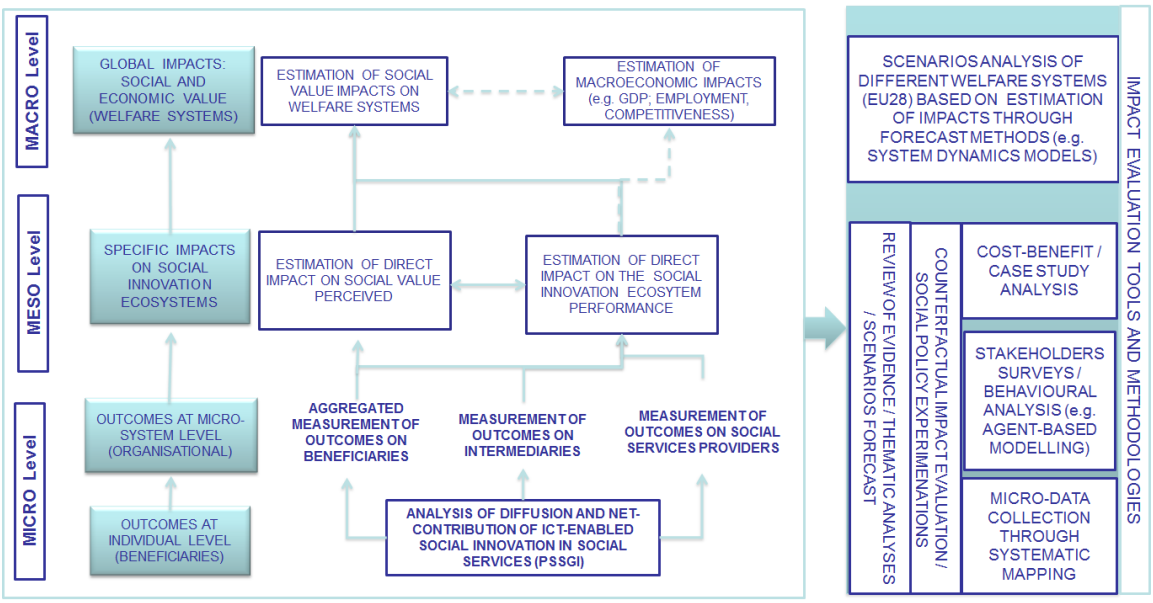
Social policy innovation is conceived as an ecosystem - *a complex adaptive system in which different phenomena are interconnected*. In this ecosystem, people act in partnerships and networks, while integrated programmes are implemented within a system of multi-level governance. Like other complex systems, it presents causal relationships which cannot be completely controlled or predicted in advance.

The dimensions of this social policy innovation ecosystem laid the foundations for the **initial proposal for i-FRAME 1.0**. This included the elements to consider for defining data and variables that serve to structure and 'feed' the impact assessment framework. One of the crucial dimensions of this ecosystem is linked to innovation process dynamics and the level of maturity of the social innovations. Knowing a social innovation's 'stage of maturity' may be important for tailoring better support measures and adequate funding structures. This is fundamental for those social innovations where ICTs play a 'game-changing' role. For these innovations, it may be more difficult to gather scientific evidence of impact with traditional evaluation techniques or modelling approaches.

The i-FRAME therefore aims to capture the direct effects and indirect consequences of policy interventions and to understand how these affect beneficiaries, organisations and possible intermediaries, as well as the social innovation eco-system, and the welfare system in which such initiatives are embedded.

The i-FRAME can include existing methodologies and approaches that can be combined depending on the specific needs and levels of analysis. However, traditional policy evaluation methods have shown their limitations when dealing with complex issues, and thus the proposed **meta-framework** is meant to overcome these limits.

Figure 1: i-FRAME 1.0 Outline



Source: Misuraca et al., 2015, JRC Technical Report, IESI D2.1 – i-FRAME 1.0

On the one hand, the **meta-framework** encompasses both objectives of helping policymakers and practitioners better understand the 'Social Policy Innovation Ecosystems' and of assessing the conditions in which where their interventions take place. On the other hand, the **operational components** focus on pragmatic micro-level measurement tools, computer-based instruments for data gathering and analysis, and macro-level simulation modelling approaches rooted in complex systems theories. These tools support the design and evaluation (*ex-ante, in-itinere,* and *ex-post*) of social policy innovations through a modular approach for development, testing, and validation.

Thus, as a result of the development and testing phase of the research, the **i-FRAME methodology** was designed as a structured approach which identifies the actions that should be followed to shape a dynamic simulation model of the impacts of ICT-enabled social innovation initiatives which promote social investment, in an attempt to link micro, meso and macro level effects. This approach can help stakeholders to cope with innovation-related uncertainties and contribute to a better understanding of the various factors which influence the evolutionary process related to social policies and their innovation. They also help to define favourable conditions by considering alternative development paths and outcomes.

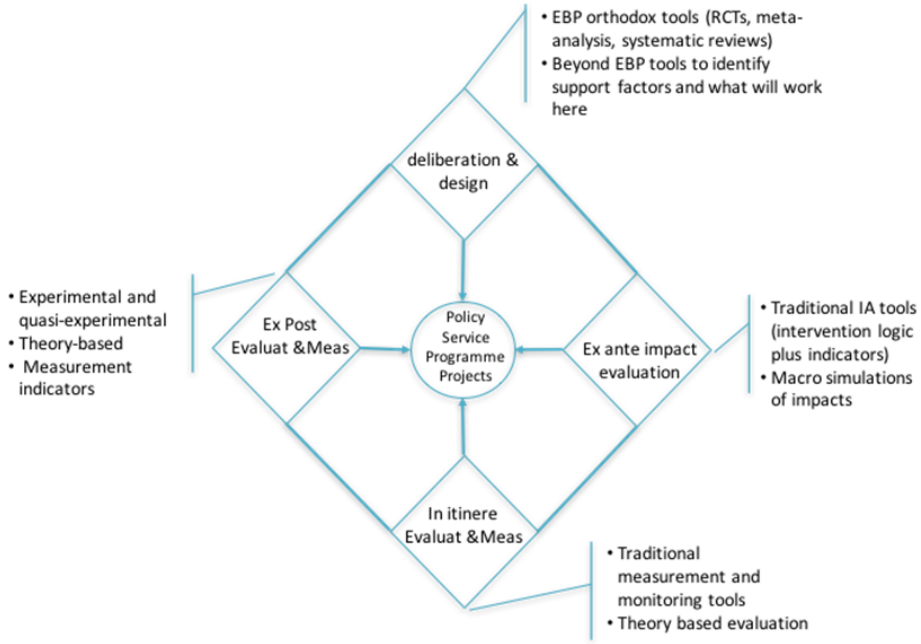
In this perspective, as demonstrated by the findings of the literature reviews, it was necessary to deconstruct and interpret **social policy innovation ecosystems** using complexity thinking. In some cases, this exercise could be conducted by using more formalised techniques such as modelling simulations that include Agent-Based Models (ABMs), System Dynamics (SD), AMB/SD hybridisation, and Social Network Analysis (SNA), all of which can be informed by **behavioural insights**.

When this is not possible, ecosystems could be reconstructed through in-depth qualitative case studies, which in turn fed into, and support, the micro- and macro-level operational tools.

In this respect, **the final version of the proposal for developing a methodological framework to assess social policy innovations which promote social investment - i-FRAME 2.0** keep both quantitative and qualitative dimensions together, by developing and piloting the various operational components in diverse stages of development and application domains, as well as different timeframes.

The i-FRAME 2.0 is thus presented as a generic meta-framework applicable at different levels: policy, service, programme and project. In addition to specific impact assessment methods, it envisages a phase of **Deliberation and Design** which will shape the design of interventions and eventually inform the three phases of evaluation in a loop that will produce gradual but constant improvements across the cycle in what we have depicted as the **Diamond for Evidence-informed Social Policy Innovation (EISPI)**.

Figure 2: Diamond for Evidence-Informed Social Policy Innovation



Source: Misuraca et al., 2017, JRC Technical Report, IESI D2.3 – i-FRAME 2.0

The operational components of the i-FRAME 2.0 for **impact assessment** then centres on a number of tools according to the three evaluation phases:

i) *Ex-ante*: traditional Impact Evaluation methods and tools (e.g. Intervention logic, measurement indicators etc.); as well as the proposal of an experimental application and extension of a simulation approach using Macroeconomic Agent-Based-Modelling (MABM);

ii) *In-itinere*: traditional measurement and monitoring tools and methodologies for theory-based evaluation; and

iii) *Ex-post:* experimental and quasi experimental techniques; structured system of measurement indicators; and theory-based impact evaluation.

This ensemble of tools can be used in interactive workshops in **policy lab sessions** and also in more traditional capacity-building exercises. To this end, a number of relevant tools are being developed and will be integrated into the prototype of the i-FRAME 2.0 computer-based simulation to be further elaborated as part of an **interactive and dynamic warehouse for Evidence-Informed Social Policy Innovation within the i-FRAME Web Platform**.

These tools would include a computer-based problem tree, and an adapted version of an electronic toolkit for impact measurement previously developed by JRC, to also support other methodologies and techniques, such as *ex ante* failure scenarios with a simplified causal model; step-by-step and backward theory-based evaluation thinking; quick exit tree approach part of the Deliberation and Design phase. In addition, an Interactive Support Tool to funnel users to the **'i-FRAME Simulator'** should be developed as part of the i-FRAME Platform. Direct users will be able to take a flexible approach, according to their degree of expertise and prior knowledge, to alternative or complementary simulation modelling that could be useful to address specific problems or policy issues.

The i-FRAME 2.0 proposal thus lays the foundations for both system-oriented formalised modelling simulations and for theory-based approaches. It also suggests defining a blueprint for conceptual modelling and the further development of the proposed operational components in line with the vision for future implementation, paving the way to building the **i-FRAME 3.0** and beyond.

In this vein, it is our opinion that **the proposed i-FRAME can make significant progress towards addressing some important issues in the area of supporting the evaluation of Social Policy Innovation which promotes social investment**. However much more needs to be done. In a future perspective, the i-FRAME has the potential for making a important contribution, especially in setting standards for the use of models for the evaluation of impacts of social policy initiatives.

The further refinement and operationalisation of the i-FRAME should build on the rich knowledge base for social innovation initiatives that has been developed by JRC. A number of proof-of-concept use cases should be defined and data from the knowledge repository could be used for calibrating simulation experiments for diverse scenarios of use. Results of test validation will be then discussed with policymakers to assess their usefulness. To this end, **connecting to other initiatives and activities using a complex systems approach to support policy making and evaluation is crucial**.

To achieve these objectives and carry out this challenging, but very much needed and timely work, **an ambitious research project shall be envisaged**, both to reinforce JRC internal capacities and make available appropriate resources. This should be embedded into a specific high-level science for policy agenda. **Experts and representatives of stakeholders shall be closely involved on an ongoing basis:** researchers from relevant scientific communities, and practitioners and policymakers shall be called on directly to address concrete and specific complex policy challenges.

The positive results of the preliminary application of the i-FRAME approach open the door to a **more extensive and systematic implementation of the proposed methodology at policy level**. This could involve building a knowledge repository of simulation models based on a portfolio of cases analysed as part of i-FRAME development and further enriched with new application examples and scenarios of use across the EU and in different policy domains.

At the same time, it would require the development of a fully-fledged dynamic electronic toolkit to support policymakers in modelling and simulating in real-time policies and programme interventions included in the i-FRAME knowledge repository. To this end, large-scale computational modelling and systems simulation tools could be exploited. These are able to capture not only predictable human behaviour through linear top-down forecasting techniques, but also unplanned outcomes of complex interactions, by taking advantage of data analytics and computer-based policy modelling. **This would lay the foundations for what could prospectively be called Data-powered i-FRAME 4.0**, which would include real-time structured data inputting from initiatives gathered through the i-FRAME Web-Platform to the i-FRAME social policy innovation simulator. This **Data-powered i-FRAME** could help the European Commission and EU Member States to monitor the implementation of actions intended to revamp the 'Social Union', and thus shape a better future for Europe.

1 Introduction

Summary of content of Chapter 1

This chapter introduces the report as follows:

§1.1 provides an overview of the policy context and research background.

§1.2 presents the objectives of i-FRAME within the context of IESI.

§1.3 outlines the specific aims and structure of this report.

1.1 Background

The notion that government is not the only provider of public services or the only actor that can deal with social problems and challenges is not new. The history of government is not a history of progressive interventionism, nor is it one of progressive retreat (e.g. privatisation, outsourcing, horizontal subsidiarity of part of welfare services passed on to NGOs and charities). Instead, it is an oscillation between these two extremes.

The main legacy of the last century is the development of the welfare state, started after the Second World War. However, according to the literature, since the 1980s, the western world - and in particular European economies - saw a resurgence of privatisation and other processes of state hollowing out. In many domains, the importance of horizontal exchange and collaboration has been acknowledged. Tacit knowledge exchanged between workers in communities of practice is a factor of economic competitiveness (Nonaka and Hirotaka, 1995). Peer tutoring between students improves their performance (Merrell and Tymms, 2011). Examples of shared value creation through close collaboration amongst private and public sectors and the citizens show how this new way of producing goods and services can be profitable and at the same time sustainable (Porter and Kramer, 2011).

Equally, dire social challenges and problems that must be faced by societies and humanity as a whole are not new either. Certainly since the publication of the often-cited Meadows report on the state of humanity at the Club of Rome (Meadows et al., 1972 – revisited in 2004), if not earlier, the limits to permanent and exponential growth in a confined system, and the considerable role technological development has played in this context, have been discussed. Even though Meadows takes a non-oppositional stance towards technology, he suggested that the use of technological measures did not resolve the world's central problems. Instead, they tended to intensify them. He believed that unforeseeable social side effects and new social problems were generally associated with even very useful new technologies and that there were no technical answers to the most significant social problems in the modern world.

This prompted a discussion regarding the need for a different way of living and a different economy, particularly in affluent industrial economies, as pointed out by the *Vienna Declaration* (2011)[1], which can be considered a sort of *Manifesto for Innovation in Social Services*. It aimed to identify the most important topics in social innovation research which address societal challenges. These were perceived as even more pressing in the current period of long-lasting world-wide economic crises. In addition, a general rethinking of the current dynamics between the market and the State has been advocated by many well-known scholars. For instance, Jacobs and Mazzucato, (2016) make the case for rethinking capitalism, and propose a new way of conceiving 'economics and policy for sustainable and inclusive development'.

1 Declaration signed by key stakeholders in the field of social innovation during the 'International Conference on Indicators and Concepts of Innovation', 19-21 September, Vienna, organised by the EC-funded project NET4ALL society and available at http://www.socialinnovation2011.eu

This is in line with what was advocated by the French economist Jean-Paul Fitoussi and the Nobel Laureates Joseph Stiglitz and Amartya Sen back in 2009, immediately after the financial downturn. They argued that there was a need to redress what engineers would call 'system failure' in order to fix social and economic inequalities.

Recently, more attention has been paid to the need to rebalance the social and economic dimensions of our societal well-being. This notion has entered the broader public and political debate through the emergence of two quasi concepts: social investment and social innovation. These are considered complementary and mutually reinforcing (see for instance Jenson, 2012).

Whereas **social investment** captures the *congeries of ideas about the objectives, areas of intervention and instruments*, **social innovation**, and *ICT-Enabled Social Innovation* in particular, '*represents the enablers and drivers for social change, more equal economic development and possible shared prosperity*'. In fact, social investment relies on social innovation to provide solutions that produce better results than existing solutions or the status quo. Social innovations can improve the efficiency of social policies and their effectiveness in addressing societal challenges and also facilitate life-long investment in human capital.

A more inclusive economy could reduce income and wealth inequalities and contribute to the common European effort to combat social exclusion, thus renewing citizens' trust in the European integration project. For many years, the European Union has therefore been devising policies which promote – directly or indirectly - social innovation and social investment. Many research projects which address social innovation and social services reform have been funded under the FP7 or H2020 programmes. An example worth mentioning is the *European Platform against Poverty and Social Exclusion* (EPAPSE) which aims to design and implement initiatives to promote social innovation for the most vulnerable in society.[2] Another is the 'Innovation Union' flagship policy, which sets new conditions to improve access to finance for social enterprises[3]. It includes the pilot project 'Social Innovation Europe', which has established a virtual hub for social entrepreneurs, public and third sector organisations[4] to be further developed under the growing Social Economy policy support agenda[5]. Other important policy initiatives that focus on social innovation were included in the legislative package on cohesion policy for 2014-2020. For example, the *European Social Fund* (ESF) supports initiatives that aim to scale up and build capacity for social innovation. Another example is the *European Regional Development Fund* (ERDF) which supports innovation in sustainable urban development. More specifically, the Employment and Social Innovation programme (EaSI) is a EU financing instrument that promotes high quality sustainable employment, guarantees adequate and decent social protection, combats social exclusion and poverty and improves working conditions.[6]

In this context, in February 2013, the European Union adopted the **Social Investment Package (SIP)**[7] to contribute to the economic growth of Europe, to protect people from poverty and to act as an economic stabiliser from inequalities. It stresses that welfare systems have to fulfil three key complementary functions: 1) social investment; 2) social protection and 3) stabilisation of the economy. The social investment approach strongly relies on the assumption that social and economic policies are mutually reinforcing.

2 http://ec.europa.eu/social/main.jsp?catId=961
3 http://ec.europa.eu/research/innovation-union/index_en.cfm
4 https://webgate.ec.europa.eu/socialinnovationeurope/it
5 See for instance the *Bratislava Declaration* on the Social Economy as a key player in providing effective answers to current societal challenges in the EU and the world adopted in Bratislava on 1st December 2016, https://coopseurope.coop/sites/default/files/Bratislava%20declaration.pdf
6 See http://ec.europa.eu/social/main.jsp?catId=1081
7 Communication from the Commission to the European Parliament, the Council, the European and Social Committee and the Committee of the Regions: Towards Social Investment for Growth and Cohesion – including implementing the European Social Fund 2014-2020. COM(2013) 83 final. See: http://ec.europa.eu/social/main.jsp?catId=1044

Social policies that form part of a social investment perspective are considered a precondition for future economic and employment growth.

Social investment, as outlined in the SIP, is thus the set of policy measures and instruments that consist of investment in human capital and enhancement of people's capacity to participate in social and economic life and in labour market. Social investment involves strengthening people's current and future capacities. In other words, social investment policies have both immediate and long-term effects, because they offer economic and social returns over time, notably in terms of employment prospects or labour market incomes.

The SIP has proposed a radical change in the approach to social services design and delivery: a citizen centric perspective and public services transformation and modernisation are the key interrelated elements of the new and more sustainable welfare systems in Europe. This is clearly evident in the way the SIP has been conceived. On the one hand, policy interventions should be designed with a life-course perspective (i.e. they should represent a continuum of measures that accompany people through the key stages of their lives: childhood, working-age, parenthood, and old age[8]). On the other hand, measures related to the various policy areas should be contemporary and mutually reinforcing. In other words, the development of institutional complementarities is a necessary condition for the implementation of successful social investment strategies. In particular, the availability of quality enabling social services has a key role to play in ensuring the integration of policy measures.[9] Moreover, changing the focus to address the needs of individuals throughout their lives also implies that innovative approaches to social services design and delivery are expected to contribute to the modernisation of European welfare systems.

The SIP Communication urges the Member States to prioritise social investment and the modernisation of their welfare systems. They must address unemployment, poverty and social exclusion challenges brought about by the economic crisis and sustainability challenges posed by the ageing population trends. The SIP emphasises that social innovation's potential is further increased by the growing range of available innovative solutions based on Information and Communication Technologies (ICTs). It is clear that **ICT-Enabled Social Innovation** plays an important role in promoting social investment policies as ICTs help to fully digitalise social services processes, to reduce social services fragmentation and duplication across organisations and countries, and to contribute to making the services more proactive and closer to the point of need. It is also an opportunity to directly engage citizens in the whole social services process design and management. Moreover, it can activate continuous improvement processes to make social protection systems more inclusive and self-sustainable in the long term.

There is a need to better understand how ICT-enabled social innovation can support social investment policies and provide recommendations to assess the implementation of the EU Social Investment Package (SIP). The European Commission's Joint Research Centre and DG Employment, Social Affairs and Inclusion (DG EMPL) have thus launched a multi-year research project entitled **'ICT-enabled social innovation to support the implementation of the Social Investment Package' (in short IESI)**.[10]

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8 Jon Kvist argues that to take full advantage of social investments, the SIP needs a more coherent framework that takes into account the dynamic and multidimensional nature of social issues and social investments. He suggests that such a framework should consist of generational, life course and gender perspectives on social investments. See Kvist, J., *'A framework for social investment strategies: Integrating generational, life course and gender perspectives in the EU social investment strategy'*, Comparative European Politics, Vol. 13, No. 1, pp. 131-149, 10.1057/cep.2014.45.

9 It is important to note that: the central role of the individual, its life course approach and the contemporary use of various policy measures are central element of the SIP and therefore they are crucial in the development of the i-FRAME which entails an approach encompassing a micro-meso-macro perspective.

10 For a more detailed presentation of the IESI conceptual and analytical framework developed as part of the IESI research see: Misuraca G., et al.. (2015), JRC Science for Policy Report, and other deliverables accessible through the JRC Science Hub's IESI Project's webpage https://ec.europa.eu/jrc/en/iesi

1.2 Objectives

The objectives of the IESI research are to:

- provide a deeper understanding of how EU Member States can make better use of ICT-Enabled Social Innovation to implement the actions suggested in the SIP;
- develop a proposal to build a methodological framework of analysis of the impacts generated by ICT-Enabled Social Innovation initiatives which promote social investment;
- contribute to building evidence-based input to social policy innovation, providing results of a structured analysis of initiatives and sharing successful experiences implemented in EU Member States.

The starting point for the analysis was to address innovative delivery of **Personal Social Services of General Interest (PSSGI)** (i.e. the services that respond to vital human needs, contributing to non-discrimination and creating equal opportunities).[11] The intended aim was to better understand how ICT-enabled social innovation initiatives which promote social investment can contribute to: simplifying administrations; integrating services; improving the management, provision and coordination of delivery mechanisms; designing high-quality and cost-effective services that meet the needs of citizens; and supporting access to and take-up of social services. In other words, *can ICT-enabled social innovation initiatives achieve a systemic effect and ensure that social policy and/or service delivery and implementation have a sustainable impact?*

One of the key components of the IESI research was **to develop a proposal for building a methodological framework to assess the impacts of ICT-Enabled Social Innovation initiatives promoting social investment in the EU.**

This methodological framework, in short the **i-FRAME**[12], aims to:

- Provide a structured approach to analyse the initiatives collected through mapping ICT-enabled social policy innovation in the EU. This approach aims to act as a guide to in-depth analysis of case studies, and provide insights into the replicability and transferability of initiatives which promote social investment across the EU.
- Serve as a comprehensive framework for conducting analysis of the economic and social returns on investment in which ICT-enabled social innovation is a key component. This shall allow the JRC to make recommendations on how the European Commission and Member States could analyse (*ex-ante, in-itinere and ex-post*) the impact of ICT-enabled social innovation initiatives which promote social investment.

The conceptual framework and methodological approach underpinning the i-FRAME were outlined by the JRC in February 2015 and then further described in the original proposal for **i-FRAME (V1.0)**. An initial proposal of how to build the operational components of the framework was formalised in June 2015, and was then further elaborated and tested with support from external experts, by applying it to selected scenarios of use drawn from case studies carried out across the EU in 2015. This allowed the JRC to develop a preliminary proposal for a theoretical and methodological approach to build the operational components of the **i-FRAME (V1.5)** and a revised and improved proposal for building the **i-FRAME (V2.0)** according to a structured theoretical framework of a simulation model for social impact assessment.

11 Since the first phases of the research, these have been classified according to the following 10 analytical types: (1) Childcare; (2) Education and training; (3) Social assistance; (4) Social care; (5) Social housing; (6) Employability; (7) Employment; (8) Social inclusion/participation; (9) Civic engagement; (10) Active and healthy ageing and long-term care (For the scope of this research, this area is further divided into three sub-themes according to the main EC policy objectives, namely: a) prevention, health promotion and rehabilitation; b) integrated care; and c) independent living).

12 The acronym i-FRAME has been suggested to stand for Impact Framework for Real and Meaningful Evaluation at the 2nd IESI Experts & Stakeholders Consultation Workshop, Brussels, 24-25 February 2015.

1.3 Outline

This report presents the final proposal for developing the **i-FRAME**. It outlines a reviewed and improved theoretical and methodological approach, which aims to develop a comprehensive framework for evaluating the social and economic impacts of ICT-enabled social innovation initiatives which promote social investment in the EU.

The final proposal for building the i-FRAME was elaborated by the JRC with help from external experts. It has been validated by testing the methodological approach and the operational components proposed on a number of case studies and scenarios of use. In addition, experts drawn from different research disciplines, practitioners and representatives of relevant stakeholders and policymakers were consulted.

This report addresses the following research objectives:

- **To review the proposed theoretical and methodological approach** underpinning the i-FRAME, so that the social and economic impacts of ICT-enabled social innovation initiatives promoting social investment can be evaluated (*ex-ante, in-itinere* and *ex-post*);
- **To design the structure of the operational components of the i-FRAME as a computer based simulation model**. This model should encompass different levels of analysis by using the same structural environment, to facilitate the collection of data through the definition of measurable, relevant and coherent indicators. It shall also take into account possible counter-intuitive behaviour and allow a flexible approach to re-calibrating the model as a consequence of *ex-post* analysis or changes in the theoretical assumptions/causal relationships and/or dynamics hypothesis underlying the framework and its operational components;
- **To provide recommendations on how to further develop the i-FRAME** as a 'social policy innovation simulator'. Scenarios of use and case studies have been used to test and validate the relationships established and the dynamic hypothesis underlying the theoretical and methodological approach to building some of the operational components of the i-FRAME that are proposed for future development.

The remainder of this report is structured as follows:

- **Chapter 2** presents the methodological approach followed to develop the i-FRAME.
- **Chapter 3** discusses the rationale which underpins the i-FRAME as regards social impact assessment. It discusses findings from the review of the state of play and outlines the initial proposal of meta-framework - **i-FRAME (V1.0**).
- **Chapter 4** presents a structured proposal for a theoretical and methodological approach to build the operational components of the **i-FRAME (V1.5)**. To this end, it discusses the potential of dynamic simulation modelling to support innovative social policy.
- **Chapter 5** outlines the final proposal for developing a methodological framework for assessing the social and economic impact of social policy innovations which promote social investment, **i-FRAME (V2.0)**. This includes an overview of the operational components of the i-FRAME, and anticipates some of the key elements that should be developed to build a comprehensive i-FRAME Web-Platform for social impact assessment.
- **Chapter 6** draws some conclusions and explains the implications these have for policy. Directions for future research are also provided suggesting recommendations for further developing the operational components of i-FRAME 2.0 and paving the way towards building **i-FRAME (V3.0)** and beyond.
- **The Technical Annexes** contain details of the findings from the systematic review conducted to further validate the previous development phases of the i-FRAME and to lay the foundations for the final proposal for the development of the i-FRAME.

2 Methodology

Summary of content of Chapter 2

This chapter summarises the methodology followed for the development and validation of the final proposal for the development of i-FRAME (V2.0). It is organised as follows:

§2.1 outlines the overall approach adopted for co-designing the i-FRAME through peer review and consultation with experts.

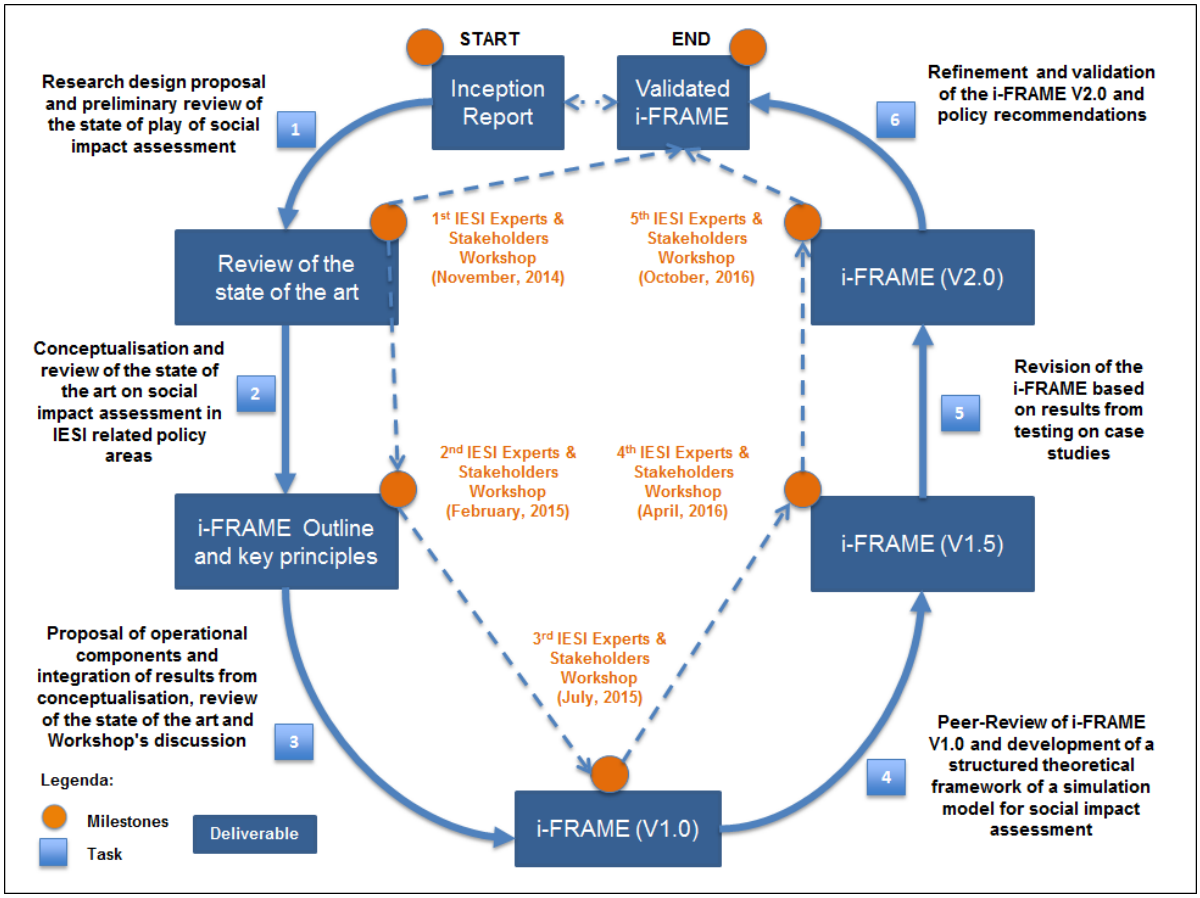
§2.2 provides an overview of the methodology used for the literature reviews and analysis of the state of the art.

§2.3 presents the activities conducted for testing the operational components of the i-FRAME and for validating the theoretical and methodological approach proposed.

2.1 Co-designing the i-FRAME

The methodological approach followed for developing the proposal for i-FRAME consisted of a number of sequential activities. These unfolded during the implementation of the IESI project and ran in parallel with the other components of the research (namely the Systematic mapping and analysis of ICT-enabled social innovation initiatives in the EU; and the Thematic analysis/case studies: focusing on the role of ICT-enabled social innovation promoting social investment to support the modernisation of social protection systems in the EU). Each activity received input from the other components of the research, which also provided specific contributions for the development and implementation of the proposal for the i-FRAME.

Figure 3: Methodological approach for developing and validating the i-FRAME



Source: own elaboration

As illustrated in **Figure 3**, the methodological approach adopted is iterative and based upon:

- Desk research to review the state of the art on social impact assessment in the policy areas under investigation and focusing on methodological approaches adopted;
- Conceptual work to outline and structure the proposed i-FRAME meta-framework and related operational components; and
- Consultation with experts from different research, practice and policy communities, including representatives of key relevant stakeholders and policymakers at local, regional, national and international levels.

A first review of the state of the art and preliminary conceptualisation work was conducted in 2014 and allowed JRC to define an initial outline of the methodological framework and to propose an approach for building the operational components.

Based on feedback received from expert consultations and integration of the results of the analysis of the review of the state of the art, the initial proposal for the **i-FRAME (V1.0)** was developed and presented in June 2015.

From July 2015 to January 2016, with support from a team of external experts JRC further developed the initial proposal for the development of i-FRAME (V1.0) following a structured theoretical framework of a simulation model for social impact assessment. The resulting revised proposal for **i-FRAME (V1.5)** was then finalised in February 2016 and further elaborated after testing on a number of case studies and scenarios of use.

The last phase of the research built on additional desk research and consultation with experts, as well as insights from external independent reviewers. This exercise brought to light the need for a further analysis of the theoretical orientations and conceptualisations on which the initial versions of the i-FRAME are based upon. In other words, the complexity which underpins evidence-based social policy evaluation needs to be better addressed in order to understand what dynamic simulation modelling could offer and the 'game-changing' role ICTs could play. Further analysis was also required in order to outline the proposed i-FRAME as a meta-framework for impact assessment of social policy innovation and to advance recommendations for practical use and further development of the i-FRAME beyond the current proposal.

The **final proposal for the design of the i-FRAME(V2.0)** presented in this report, thus outlines a comprehensive approach for defining a common methodological framework with recommendations for its further development as a computer-based simulation model.

The proposed framework is structured according to a series of operational components that shall be further defined according to different typologies of initiatives and stakeholders involved. It should be stressed, in fact, that while the logic model underpinning the i-FRAME is necessarily generic in order to address the broad spectrum of social policy initiatives, the operational components of the i-FRAME are structured so as to address the potential impact of social policy innovations in a specific policy area.

The development of the initial proposal for i-FRAME (V1.0) proposed in 2015 was based on a categorisation of the various typologies of initiatives labelled as ICT-enabled social innovation promoting social investment. The related impact dimensions and variables considered in modelling the i-FRAME were further defined in the following phase of the research, and served to advance the structured methodological framework of the i-FRAME (V1.5).

These impact dimensions and variables served as a guide for designing the final proposal for developing the i-FRAME (V2.0) and for perfecting the operational components of the modelling and simulation approach to be developed for assessing the effects of initiatives. Thus a comprehensive picture can be provided of the potential impacts that broader social policy innovations may generate. This would lay the foundations for further developing specific indicators, methods and tools to measure and evaluate them.

2.2 State of the art and literature review

In order to conceptualise the overall proposal for i-FRAME as a 'meta-framework' for assessing the economic and social impact of social policy innovations which promote social investment, and to define and further develop the operational components of the i-FRAME simulation model, an extensive analysis of the state of the art based on sequential specific reviews of the literature was considered crucial.

These reviews aimed to provide a comprehensive picture of the various domains to which social investment policies might apply. They also appraised the methodologies that could be used to evaluate the impacts of these interventions, taking into account the specificities of different approaches to social policy innovation.

In 2014 – 2015, given the exploratory nature of the research, the review of the state of the art focused on making sense of the broad **debate on measurement and evaluation of social impact**. Though this topic is not new, it has gained increasing importance recently under the umbrella of social performance and outcome measurement generated by non-profit organisations and social ventures. This trend has been discussed with growing intensity in evaluation research (e.g. Stufflebeam and Shinkfield, 2007) as many stakeholders in the non-profit sector have begun to increasingly shift their operations towards a market and profit-oriented way of thinking. Social entrepreneurs and venture philanthropists, in some cases backed by funding from foundations, have started applying well or less well-known concepts of outcome and impact analysis and measurement of their own accord.

At the same time, the research community started to pay attention to currently popular concepts of social impact measurement and, in particular, to **Social Return on Investment (SROI)** analysis as an alternative to mainstream concepts of (economic) evaluation that have been known and applied for a long time. In this respect, pragmatic evaluation approaches became popular, such as for instance the logic model or the impact chain, also known as 'theory of change'. These approaches are playing an increasingly important role in evaluation practice. At the same time, policymakers have started considering social impact assessment techniques weighting advantages vs. disadvantages, alongside more traditional cost benefit analyses of economic evaluation.

Thus, the preliminary review of the state of play, conducted as the basis for the initial proposal for the development of i-FRAME 1.0, generally addressed the topic of impact measurement in two ways. Firstly, it analysed broader **approaches for social impact assessment** (e.g. Maas and Liket, 2011; Epstein and Yuthas, 2014; Mildenberger et al. 2012; Rauscher, 2012). Secondly, it also looked at various **methods for outcome measurement and impact evaluation**. These have a significantly longer tradition in evaluation research (see Rossi et al. 1994, 2004; Stockmann et al. 2006 and for a focused policy and practice-oriented review, Misuraca et al, 2014).

The orientations set out in the original proposal for i-FRAME 1.0 identified that *'when complexity is one of the dominant aspects of a phenomenon (or a series of interlinked phenomena), the most appropriate way to analyse it as a complex system is by using modelling at first and then possibly simulation in order to understand its behaviour and attempt predicting its evolution'*.

Then, in 2015 – 2016, as part of the research activities to develop the i-FRAME 1.5, a further review of literature was conducted. This review had two objectives. First, it aimed to compare different methodological approaches that could be applied to the modelling and simulation of complex systems, particularly in the field of ICT-enabled social innovation promoting social investment. Second, it aimed to review existing applications of those approaches identified as most suitable, either on their own or in combination. This literature review identified examples of applications of modelling and simulation to assess the impacts of ICT-enabled social innovation initiatives and to investigate their key characteristics, in order to understand how to use them to shape the i-FRAME.

The literature review addressing the first objective consisted of a **cross-analysis of modelling and simulation capabilities** of the following modelling methods: General Equilibrium; System Dynamics; Markov; Agent Based; Discrete Event. These represent the most common methodological approaches to modelling and simulation applied worldwide. In order to conduct this cross-comparison, the search concentrated on recent papers which discussed the advantages and disadvantages of the different methods of modelling and simulation listed above. The results of this comparison provided evidence of how Dynamic Simulation, and in particular Systems Dynamics (SD), Agent-Based Modelling Simulation (ABMS) and their combination through an Dynamic Simulation Hybrid Model (DS-HM) seem to be the most suitable approaches to the problem addressed by social policy innovations. These modelling techniques are characterised by nonlinearity and retroactions that cannot be easily represented by other classes of modelling and simulation methods.[13]

The review addressing the second objective – i.e. of **applications of modelling and simulation approaches** - was based on an extensive and systematic search. This search aimed to identify clear examples of applications of SD and ABMS Modelling and simulation which assess the impacts of ICT-enabled social innovation initiatives promoting social investment. The search focused specifically on Personal Social Services of General Interest (PSSGI). The research team initially identified 953 papers that potentially addressed the use of dynamic simulation in the fields of analysis. A further examination of the abstracts of these papers in order to select only those which explicitly contained a description of dynamic simulation models in relevant fields, led to the selection of a subset of 137 papers. A full reading of their contents further reduced the number of papers to 65.

Modelling ecosystems as complex as those of social policy innovation applied to PSSGI require a close connection between data and model (Ahrweiler, 2017; Ahrweiler *et al.* 2015). Data availability for calibrating a model of the social innovation ecosystem as 'target' is crucial for the relevance and utility of any simulation results. This is, obviously, one of the limitations that must be flagged up in the development from i-FRAME 1.0 to i-FRAME 2.0. The time and resources available did not allow the research team to map all possible data against all possible models to undertake this calibration work. This very demanding and time consuming work will, however, have to be conducted in the coming years, if the i-FRAME is to be implemented and realise its promise as a practical instrument for policymakers.

In 2016, **a supplementary systematic literature review was conducted** in order to further review the theoretical foundations which underpin the design for the proposed methodological framework (i-FRAME 2.0). Thus, the design and set of operational components advanced was improved, and the area under analysis was broadened (see Chapter 5). The review screened the existing literature in the field of social impact assessment and social policy innovations which promote social investment, by combining impact evaluations and assessments of social innovation in six domains: Employment and training, Child care, Long-term care, Social Inclusion, Social Housing, Social Assistance[14,15].

13 A summary with details on the results of the comparison of modelling approaches is reported in **Annex I.**

14 Building on the approach advanced as part of the IESI research the review considered what constitute Social Services of General Interest (SSGI) according to the first Communication on this topic released in 2006 by the European Commission which identified two broad types of services: (1) Statutory and complementary social security schemes covering the main risks of life; and (2) Services provided directly to the person, such as social assistance services, employment and training services, childcare, social housing or long-term care for the elderly and for people with disabilities. The sub-category (2) can be considered as broadly corresponding to the concept of PSSGI and the mentioned communication included five main areas: employment and training services; Social housing; Child care, Long-term care, social assistance services. To these five, Social inclusion services was added given their relevance for the i-FRAME. These 6 categories comprehend the analytical types defined in the IESI research scope (see Misuraca et al., 2015) and have been used to test the i-FRAME on broader social services areas of impact.

15 Details on methods and sources of the systematic review are provided in the **Annexes III, V and VI**.

This supplementary analysis had two objectives. One was to further confirm and validate choices made in the design of the i-FRAME, following the findings of the previous literature reviews and analysis of the state of the art. The other was to expand the scope of the review to include the broader concept of **social policy innovation promoting social investment**. ICTs are, of course, an important component of this kind of innovation, but the research team did not want to limit the analysis of innovation in social policy and social services to only those involving digital technology. This decision was made as a consequence of the findings from previous reviews and consultation with experts and representatives of stakeholders. In addition, widening the scope of the possible analysis provided the opportunity to better define recommendations to go beyond the exploratory phase of the IESI research and to extend it to other policy fields.

The analysis considered existing reviews or meta-analyses and adopted a structured approach to finding and choosing the relevant articles. This selection could not be too broad, as we had to have a manageable number of papers, nor could it be too restricted, if all the existing relevant evidence was to be included. The selection of the relevant articles followed three steps:

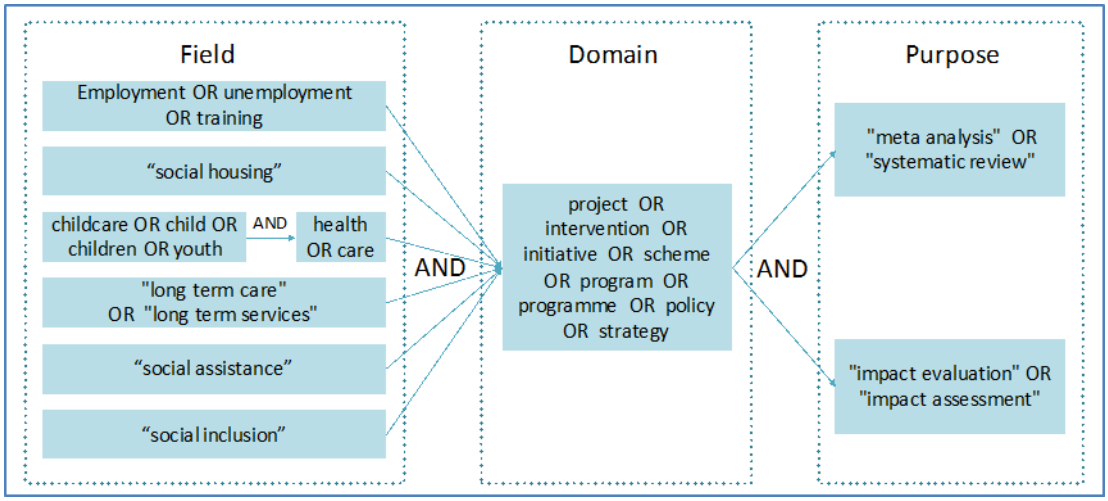
(i) Setting the scope, the search string, and the inclusion criteria;

(ii) Creating the database, identifying studies; and

(iii) Selecting the studies to be included in the review.

Figure 4 summarises the approach adopted for the systematic review.

Figure 4: Methodological framework for systematic review



Source: own elaboration

This supplementary search was conducted in November 2016 in four electronic databases: IDEAS – RePEc (Research Papers in Economics), SSRN (Social Science Research Network), ISI Web of Science, and Scopus. After in-depth screening, the final selection consisted of 219 results, made up of 155 meta-analyses and 64 evaluations. In parallel to the analysis of the scientific sources search, an extensive desk review of grey literature was carried out, to gather sources complementary to those identified in the systematic review. These sources included EU policy and guidance documents, funding programmes, individual projects and one-off initiatives. At policy level, the starting point was the **Social Investment Package (SIP)** which, importantly, underlines the added value in focusing on innovative social policies and on embedding innovation in evidence-based policy-making. In addition, the seven **Europe 2020 flagship initiatives** were also reviewed to assess their contribution to and consideration of social innovation within the broader EU policy framework (**Table 1**).

Table 1: Social innovation in the Europe 2020 strategy

Flagship Initiative	Social Innovation uptake
A resource-efficient Europe	Energy Efficiency Directive Eco-design Directive Citizen Energy Forum's Vulnerable Consumers Working Group Resource efficiency indicators
An industrial policy for the globalisation era	Single Market Act I Single Market Act II Social Business Initiative COSME Workplace innovation
Digital Agenda for Europe	Digital skills and jobs Regulatory environment, protection of property Digital infrastructure
Innovation Union	Social Innovation Europe virtual hub Innovation in social policy (ESF, PROGRESS) Dedicated FP7/H2020 calls European Public Sector Innovation Scoreboard European Innovation Partnerships
Youth on the Move	Youth participation in policy design Workplace and entrepreneurial experience University modernization
The agenda for new skills and jobs	Labour market reforms in the social economy Job quality and skills development Measures to improve education and training systems
The European Platform against Poverty and Social Exclusion	Developing an evidence-based approach to social innovations and reforms Promoting a partnership approach to the social economy

Source: own elaboration

At the programme and project level, the review focused on the EaSI programme, its predecessor PROGRESS, on Regional Policy, and on the uptake of social innovation by the European Structural and Investment Funds (ESIF). It also looked at the many EU-funded research projects, such as FP7, that more or less directly deal with social innovation. In addition, EU-backed one-off initiatives for policymakers and social innovators were also reviewed. See **Table 2**, and details in **Annex**.

In addition, an analysis of scientific and grey sources was performed to help contextualise the refinement and improvement of the proposed operational components of the i-FRAME. This looked first at scientific literature that discusses descriptively or prescriptively past and current reforms which aimed to establish '**One stop shop**' approaches (i.e. integrated, joined up, etc.) to the delivery of social services (Angers, 2011; Askim et al., 2011; Budapest Institute, 2014a, 2014b; Champion and Bonoli, 2011; Christensen and Lægreid, 2007; Clasen and Clegg, 2011; Clasen et al., 2001; Ditch and Roberts, 2002; Lindsay et al., 2008; McQuaid, 2010; McQuaid et al., 2007; Minas, 2014; Mosley, 2011; Munday, 2007; OECD, 2003; Øverbye et al., 2010; Scharle et al., 2014; Struyven, 2004; van Berkel et al., 2012; Wiggan, 2007).

One stop shops are clearly relevant to the discussion of service integration, which has been a specific dimension of the IESI research since its inception (see Misuraca *et al.*, 2015). This review confirmed that there is little evaluative evidence on the effectiveness of this approach. It did however highlight the administrative, organisational, and governance complexity of integrated social service delivery.

The grey literature sources address precisely the topic of **social services complexity**. To some extent, these sources express a critique of the indiscriminate and deterministic application of Evidence-Based Policy prescriptions and hierarchies of evidence to social policies and social service delivery.

This literature was selected from the growing body of academic critical appraisals (Cartwright & Hardie, 2012; McMillin, 2012; Munro, 2014; Pawson, 2002; Pawson, 2006; Petticrew & Roberts, 2003; Sanderson, 2011; Strassheim & Kettunen, 2014; Torriti, 2010), also looking at official EBP prescriptions and evaluations (Allen, 2011; Balshem et al., 2011; Bohrnstedt & Stecher, 2002; Cabinet Office, 1999; Davies et al., 2000; EFF, 2005; GLA, 2010; Haynes et al., 2012; Munro, 2011;UKDPC, 2008; UNICEF, 2008).

Table 2: Social Innovation in EU initiatives

EU initiative	Social Innovation uptake
EASI programme	Design, evaluation and larger-scale implementation of new social policy initiatives in line with the SIP approach Exploring the role of PPPs in welfare reforms and investment in human capital Award schemes for social entrepreneurs Social policy experimentation in support of SIP actions: housing first, one-stop-shops, and work-in-stations
Research Projects funded by EC Framework Programmes (FP7, H2020)	CRESSI (Creating Economic Space for Social Innovation) EFESEIIS (Enabling the flourishing and evolution of social entrepreneurship for innovative and inclusive societies) ImPRovE (Poverty Reduction in Europe: Social policy and innovation) ITSSOIN (Social Innovation and Civic Engagement) SEFORIS (Social Enterprise as Force for more Inclusive and Innovative Societies) SI-DRIVE (Social Innovation: Driving Force of Social Change) SIMPACT (Boosting the Impact of Social Innovation in Europe through Economic Underpinnings) SocIEtY (Social Innovation - Empowering the Young for the Common Good) TEPSIE (Theoretical, Empirical and Policy Foundations for Social Innovation in Europe) Third Sector Impact (The Contribution of the Third Sector to Europe's Socio-economic Development) TRANSIT (Transformative Social Innovation Theory)
European Structural and Investment Funds (ESIF)	European Social Fund (ESF) European Regional Development Fund (ERDF), in particular actions for the development of ICTs and social entrepreneurship European Agricultural Fund for Rural Development (EAFRD)
Other initiatives	COSME programme Erasmus for Young Entrepreneurs Erasmus+ Creative Europe Eco-Innovation Action Plan

Source: own elaboration

2.3 Testing and validation

In order to test and validate the theoretical and methodological approach which underpins the i-FRAME, three complementary activities were carried out during the research. These activities are being further developed as part of current research, which has continued beyond the exploratory phase of the IESI project.

First of all, the i-FRAME methodology was applied qualitatively to a number of **Case studies** which were drawn either from research conducted by the JRC as part of a complementary component of the IESI project, or selected *ad hoc* for their specificities. These case studies address the implementation of ICT-enabled social innovation initiatives across the EU. They involve various policy domains that integrate offer of various PSSGI. They therefore constitute an interesting testing environment to validate the possibility of using the i-FRAME methodology to dynamically simulate the impacts of these innovations in the context of social policy reforms in the EU. This kind of testing and validation activity is being further developed as part of the current research activities of JRC to pilot and validate the i-FRAME 2.0 (see Chapter 5).

In addition, a quantitative validation of the degree of applicability of the i-FRAME methodology was done using two **Scenarios of use** related to the implementation of ICT-enabled social innovation in different programmes and contexts of social services delivery. This activity aimed to show, in practical terms, how the proposed approach to dynamic simulation could be applied to simulate the impact ICT-enabled social innovation initiatives could have on various social service delivery processes. The experimentation of the operational components for dynamic simulation modelling using scenarios of use, as proposed for the i-FRAME 2.0, is part of the JRC's current research activities in piloting and validating it (see Chapter 5).

Finally, **consultation with experts and representatives of stakeholders** allowed the IESI research team to gather insights from researchers, practitioners and policymakers in order to better define the characteristics of the approach proposed. This included the organisation of dedicated 'Group model building' sessions at the second IESI Workshop in Brussels on 24-25 February, the third IESI Workshop in Seville on 7-8 July 2015 and some ad hoc i-FRAME Workshops[16].

In 2015, The i-FRAME proposal was also presented and discussed in various **scientific and policy events**: the Social Innovation Research Conference (SIRC) in Shanghai, on 21 May 2015; the SIMPACT Workshop in Brussels on 25 June 2015; the International Conference on Complex Systems in Turin on 14 October 2015, the ICT Event in Lisbon on 21 October 2015. In 2016, it was presented and discussed at the 1st European Conference on Digital Ecosystems for Social Services, Rome, 20 May 2016; the European Social Services Conference (ESSC), The Hague, 20-22 June 2016; the DSI4EU event on Shaping the Future of Digital Social Innovation in Europe, Brussels, 29 June 2016; the Experts Hearing on the Future of Welfare systems as part of the consultation on the EU Pillar on social Rights, Brussels 30 June 2016, and the launch of the Social Innovation Community (SIC) in Brussels on 26 September 2016.

Finally, the i-FRAME 2.0 proposal was discussed at a restricted IESI Experts Workshop in Seville on 25 October 2016, which was attended by modellers and science-for-policy advisers. The final proposal was also presented to relevant stakeholders at the DSIFair 2017 in Rome on 2 February 2017; to experts at the FuturICT2.0 workshop in Rome on 3 February 2017; and at the 1st International Conference on Synthetic Population (ICSP) in Lucca on 22-23 February 2017.

The Final IESI Conference held in Brussels on 14-15 March 2017 allowed further discussion with experts, representatives of key stakeholders and policymakers to plan future developments and the way forward for research (see Chapter 5 and 6).

[16] i.e. the ESN Seminar on Evidence Based Policy, Manchester, 4 November 2015; the EIPA Public Sector Innovation Lab, Barcelona, 10 December 2015, and the eGov Conference, Guimaraes, 6 September 2016.

3 i-FRAME 1.0: piecing the puzzle together

Summary of content of Chapter 3

This chapter provides an overview of the initial proposal of i-FRAME (V1.0). It is organised as follows:

§3.1 discusses the quest for social impact assessment;

§3.2 elaborates on the need to tackle the complexity of the digital social policy innovation ´ecosystem´

§3.3 outlines the initial proposal of i-FRAME as a ´meta-framework´ for social impact assessment.

3.1 The quest for and challenges of social impact assessment

The review of the state of the art conducted during the first phase of the IESI research led to the conclusion that:

- It is widely recognised that **social impact assessment is still under-researched** and evaluation approaches undertaken are methodologically weak.
- Though social impact assessment is still largely perceived as 'nice to have', **it is generally not included in the design of interventions**.
- **There is a lack of accepted and tested methods, tools and indicators** to assess the social and economic impact of ICT-enabled social innovation initiatives in general and of those promoting integrated approaches to social services in particular.

However, the review confirmed that although Social Impact Assessment (SIA) is less developed than the assessment of economic and financial impacts, it is gaining momentum in both research and policy.

In terms of policy, this is clearly demonstrated by the strong commitment expressed by the President of the European Commission, Jean-Claude Juncker. The Political Guidelines for the European Commission, entitled 'A New Start for Europe: My Agenda for Jobs, Growth, Fairness and Democratic Change' (European Commission, 2014e), said that:

'*…in the future, any support and reform programme goes not only through a fiscal sustainability assessment but through a social impact assessment as well. The social effects of structural reforms need to be discussed in public*'.

From a 'practice-oriented' perspective, this momentum is reflected in the KPMG report 'A New Vision of Value', which argues that societal and corporate values are inter-connected. Methodologies for measuring impact should shift from financial-driven impact assessments to taking into account societal values when assessing the outcomes of an initiative (KPMG, 2014a). In the report, it is advocated the development of a 'true value method of analysis'. This method would aim to provide a model based on case study analysis to explore the potential of monetising impacts, taking into account both the positive and negative externalities of social investments.

This need of combining financial returns and social value, finding a positive correlation between the two, is also referred to as **'(Social) Impact Investing'** (e.g. Bugg-Levine and Emerson, 2011).

The issues related to social impact assessment have been debated for several years now. However, the analysis of the state of the art still points to the **need to define a methodological approach and develop a meta-framework capable of assessing the social and economic returns of initiatives promoting social investment**.

This need is even more pressing when it comes to assessing impacts generated by ICT-enabled solutions that address complex phenomena in the broad domain of **social policy innovation which promote social investment**.

As anticipated in **Chapter 1**, these require that:

- Policy interventions should be conceived from a **life-course perspective** (i.e. they should represent a continuum of measures which accompany people through the key stages of their lives: childhood, working-age, parenthood, and old age; and
- Measures related to the various policy areas should be **contemporaneous (i.e. occurring at the same time) and mutually reinforcing**. In other words, the development of institutional complementarities is a necessary condition for the implementation of successful social investment strategies.

From this perspective, **the review of literature and practice demonstrates that traditional econometric and innovation models have not provided a comprehensive approach. They do not integrate: a) social, economic and environmental concerns; or b) heterogeneous agents' behaviours, roles and relationships**. Therefore, along with interdisciplinary research to address the multiple dimensions which characterise social policies, alternative methods to complement more traditional evaluation techniques are needed. Foresight, scenario building, and modelling and simulation techniques can all be used to help stakeholders to cope with innovation-related uncertainties. These methods contribute to a better understanding of the various factors which influence the evolutionary process related to social policies and their innovation. They also help to define favourable conditions by considering alternative development paths and outcomes.

When complexity is the defining aspect of a phenomenon, the most appropriate way to analyse it as a 'complex system' is by using modelling first. Then simulation can be used to understand its behaviour and to attempt to predict its evolution. If, for example, the situation modelled is a socio-economic issue, modelling and simulation can give a numerical indication of the resources needed, the time required to achieve an objective, the duration of an initiative, and so on. This gives a detailed qualitative idea first. Then quantitative values can be obtained when the numerical simulation is applied to the analysis and an assessment of all the possible performance indicators is made. Consequently, modelling can provide evidence to highlight the ideas, doubts, and intentions of the policy and decision makers involved in possible structural, operational and organisational changes (Misuraca et al., 2016)[17].

Within this context, a '**model**' is defined as *'a physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process*', and the act of **modelling** as the *'application of a standard, rigorous, structured methodology to create and validate a physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process*' (USA, DoD, 1998 and 2010).

Under this perspective a model can be considered as a tool for aiding in the understanding and the predicting of a system's behaviour, while **simulation** can be defined as *'the exercise (either statistically or over the time) of a model'*. The process of **modelling and simulation** thereby consists in '*the rigorous process of conceptualising, developing, and if necessary testing the model, followed by the exercise of that model to study its behaviour*' (Sterman, 2000 and 2006).

17 Approaches based on modelling of complex systems, although applied often in the health sector are rarely used to address social care or social work. However, social work theorists have drawn extensively on 'Systems thinking' and simulation, thus methodological approaches such as Systems Dynamics appears to be appropriate to illustrate the variety of phenomena that can describe the complexity of social services delivery (McKelvie, 2013).

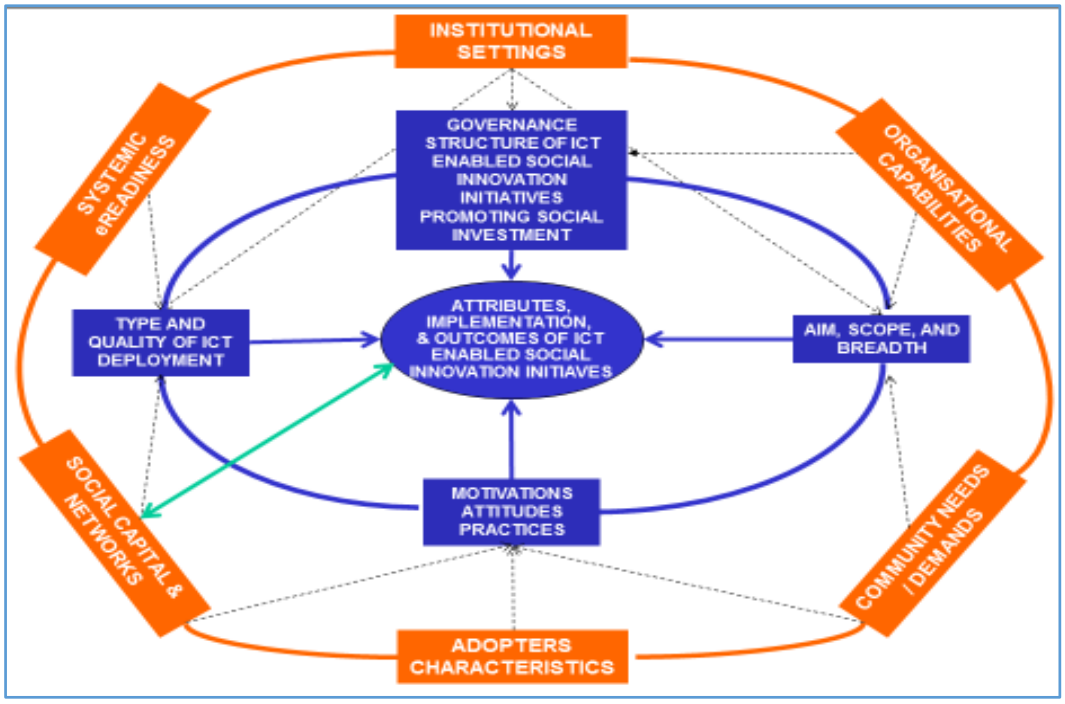
3.2 Addressing the complexity of digital social policy innovation

Findings from the analysis of the state of the art show that -broadly speaking- there are the following three main types of innovation in social policies:

- **Service innovation**. Innovation in social services may derive from opposite drivers: individualisation vs. standardisation (e.g. a new concept in the delivery of social services, common to several very different targets, is that of 'care at home is better'. For instance, the concept of deinstitutionalisation and community care are widely applied to care of mental health patients, the elderly and abandoned children). Service innovation also involves the concept of service accessibility, i.e. how access to services is organised, the costs of access for families and the type of access (voluntary vs. compulsory).
- **Governance Innovation**. Innovation in Governance includes new work arrangements, and the involvement of new stakeholders. It can also consist of innovation in organisational systems such as the search for new 'solutions' through the implementation of new methods of management or multi-stakeholder partnerships. These changes in governance introduce different relationships between stakeholders and different decision-making mechanisms.
- **Digital innovation**. The social services sector is centred on people and service delivery. Hence, ICTs can contribute a great deal to the personalisation of services by providing a targeted service and personalised experiences. Moreover, ICT-enabled innovation in social services also influences, and is influenced by, the interaction between different actors. This interaction affects the roles played by stakeholders and end users and the relationships between them, and also the way social networks are structured. New forms of interaction/cooperation can emerge thanks to ICTs, as can new approaches to acquiring funding, and monitoring and assessing results.

These key drivers of innovation in social policy provide the basis for a generic 'modelling environment', which can be defined as the **'Ecosystem of ICT-Enabled Social Innovation**' that promotes social investment see **Figure 5**.

Figure 5: Ecosystem of ICT-Enabled Social Innovation promoting social investment: generic stylised modelling environment and its dynamics



Source: Misuraca et al., 2015, p. 44

In line with the scope of the IESI research, this ecosystem is represented in **Figure 5** as having an outer ring with macro-meso level contextual variables, and an inner ring with the key components of social services deployment/implementation and/or functioning (meso-micro level). The outer variables in combination with the specific dimensions of each ICT-enabled social innovation initiative shape the attributes of the PSSGI provided. The level of deployment/diffusion and the outcomes produced by each initiative correspond to the level of governance adopted by different types of PSSGI considered[18].

In the case of ICT-enabled social innovations, institutional settings generally involve what is legitimate and possible/desirable according to political norms, laws, regulations, and policies, and access to funding mechanisms. These settings influence the governance of the ICT-enabled social services and its ecosystem network configuration (equivalent to what in business terms would be the value chain) both:

- Indirectly, by way of available funding and policy at the macro-meso-micro level, as institutional settings also shape the level of systemic eReadiness (i.e. availability, usage and cost of ICTs) in the specific context (e.g. local community, region, country);
- And directly, given the funds made available for social services and the scope of action defined by regulation and policies, including the institutional settings which influence the aim and scope of the social services and the type of ICTs deployed. Although it is not possible to insert institutional settings in the graph, they (especially access to funding) have considerable impact on an initiative's long-term sustainability.

The socio-economic conditions in a given community make some social needs and challenges more pressing than others. Although these conditions are not visible in the graph, they also influence the laws, regulations, and policies defining the scope of social services. The community's needs and challenges evidently trigger the actions of the adopters of ICT-enabled social innovations and shape their motivations and attitudes. They also affect organisational capabilities and how they are reflected in the definition of the aims, scope and breadth of the services.

The notion of social capital and collaborative networks plays an important role in the context in which social services are implemented. The existence of vibrant social capital and community networks clearly drives success, whereby the configuration of social capital and network influences and is influenced by the level of systemic eReadiness.

3.3 Outlining a 'meta-framework' for social impact assessment

The dimensions of the ecosystem of ICT-enabled social innovation which promotes social investment that we briefly described above laid the foundations for the initial proposal for **i-FRAME 1.0**. This included the elements to consider for defining data and variables that would serve to structure and 'feed' the impact assessment framework.

One of the crucial dimensions of the ICT-enabled social innovation ecosystem is clearly linked to innovation process dynamics and the level of maturity of the social innovations. Knowing a social innovation's 'stage of maturity' may be important for tailoring better support measures and adequate funding structures. This is more important for those social innovations where ICTs play a 'game-changing' role (see Misuraca et al., 2015). For these innovations, it may be more difficult to gather scientific evidence of impact with traditional evaluation techniques or modelling approaches.

18 For the sake of simplicity, the ecosystem depicted in **Figure 5** does not report all possible interactions among all the variables within each ring and between the two rings. These interactions are implied.

We are in an exciting period of innovation characterised by schemes based on traditional and emerging ICTs, new funding models, and a more dynamic relationship between governments, citizens, and service providers from the private and not-for-profit sectors.

Social innovation - and more specifically ICT-enabled social innovation - can thus make an important contribution to social policy reform by providing new/better/different ways of integrating the provision of social services. But evidence to inform decisions is often limited or produced too late, thus becoming meaningless, or insufficient to support policy-making in a structured manner.

The other important dimension underlying the conceptual framework advanced as part of the IESI research, refers to *'The increased coordination of operations across traditional functional units in the public sector, and also across other non-public sector providers, the aim being to put the final users/beneficiaries (including service intermediaries) in the centre and treat their needs holistically'* (Misuraca et al., 2015).

The focus on integrated approaches to social services is due to the fact that they can generally improve efficiency of social service systems. In addition, it is assumed that they can also better solve what are known as **'wicked problems'** – for example, the provision of social services in the current context of economic and social turmoil. These problems are related to many causes and effects, which overlap and intertwine. They require multifaceted solutions and multi-service provision. Social services integration can be considered as an answer to wicked problems, and ICT-enabled social innovation as a 'change' factor associated with it.

Hence, when the i-FRAME was designed, the main aim was to develop a multi-level and multi-dimensional approach from both:

- **An operational perspective**, as the integration of services enhances organisational performance and the effectiveness of services in terms of improved outcomes, efficiency and reduced costs. It also increases capacity and value for money, strengthens strategic planning and system integrity, and reduces demand for crisis services. Moreover, from the beneficiary's perspective, it provides simplified access, holistic and customised support, faster response times, and improved outcomes and user experience.
- **A system perspective**, as a service does not have an autonomous existence in the same way that a physical thing with technical specifications does (Crepaldi et al., 2012). It is a social construction (with its world of reference), which fits into time frames in different ways (time horizon) and into matter (degree of materiality) (Djellal and Gallouj, 2001). Thus the relational dimension plays a central role, as the relationship between the user and the service provider is direct (Bandt and Gadrey, 1994; Gadrey, 2003; Laville, 2011). In this context, the technological dimension can play an important role in social services innovation processes and can contribute positively to the quality and productivity of services with new solutions to policy challenges (Randle and Kippin 2014).

Therefore, to address the **first objective of the i-FRAME** (i.e. to provide a structured approach for analysing the initiatives collected through the mapping of ICT-enabled social policy innovation in the EU), an analytical framework for mapping and analysing initiatives of ICT-enabled social innovation in integrated approaches to social services delivery was developed. The framework elaborates on the interrelationship between four main dimensions of analysis, namely: **1) ICT-enabled innovation potential; 2) levels of governance of service integration 3) elements of social innovation; and 4) types of service integration**. In addition, it serves to analyse the initiatives collected as part of the research, positioning them in the 'IESI Knowledge Map' (see Misuraca et al., 2015).

Building on the IESI analytical framework, a preliminary proposal of operational components for assessing outcomes and possible impacts of ICT-enabled social innovation initiatives was developed. This analysis is mainly at the micro-level, but it also has implications for the meso level (See Misuraca et al., 2015).

This choice of operational components, which mainly include the key dimensions of direct and indirect outcomes and possible indicators for measuring outputs and outcomes, is based on an **intervention logic model**. This is a representation of how a policy, a programme or an initiative functions theoretically under specific conditions to achieve the desired target objectives.

In simple terms, the conditions of an intervention/programme/policy are understood as the factors from which the initiative, programme or policy starts. These are normally:

- The general conditions, such as economic, political or social circumstances (i.e. the context in which an intervention takes place);
- The target group specifications (i.e. attitudes, knowledge, needs and compliance of the target group members must be taken into account);
- The financial, human and material resources (input); and
- The characteristics of the 'programme sponsor', such as its legal form or financing structure. These characteristics also include how the parties responsible for the programme's implementation define when targets should be achieved, with which target group, through which activities, etc.

During the process, the measures intended to achieve the target are implemented. Those contributions that are directly provided by the intervention, programme or policy are referred to as **outputs** (which are directly measurable results). **Outcomes** represent the desired conditions for the members of the target groups after completion of the activities. The outputs are meant to produce the desired outcomes and contribute to the achievement of specific (i.e. directly linked to the initiative, programme or policy), or broader global **impacts** (i.e. affecting socio-economic conditions of the context of reference) in a way that is logically, theoretically or empirically substantiated.

However, while it is assumed that the impacts of policies, programmes or initiatives can be logically derived and estimated through a logic model based on theory of change, the effective cause-effect relationships cannot be substantiated by this approach.

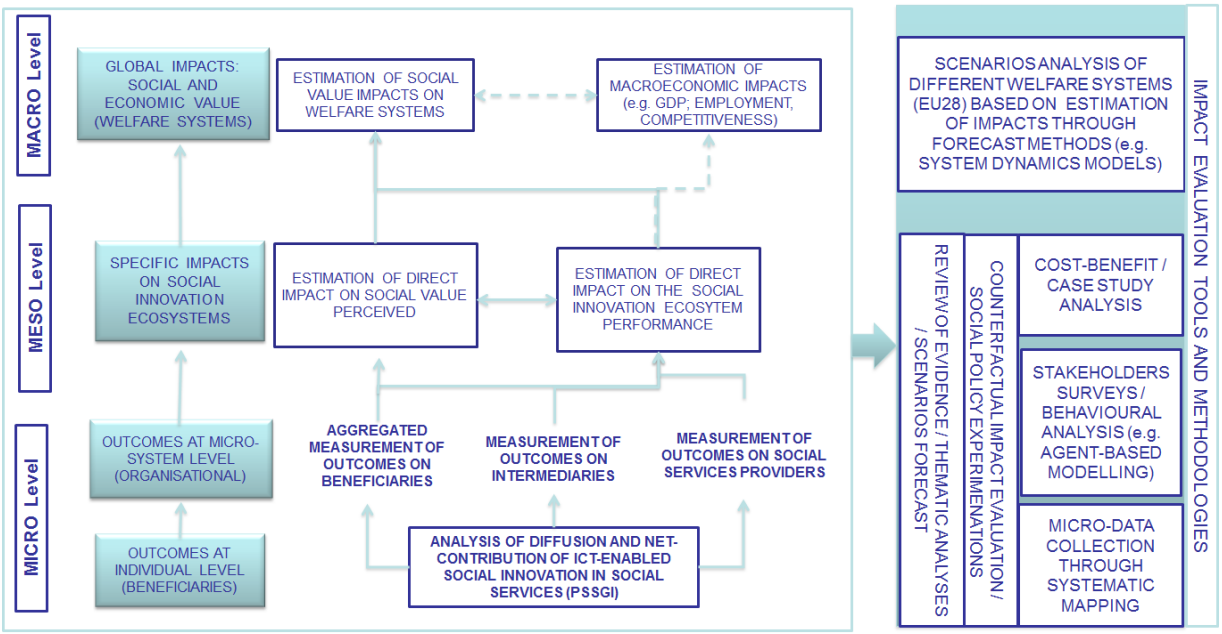
Therefore, in order to address the **second objective of the i-FRAME** (i.e. to serve as a comprehensive framework for conducting analysis of the economic and social returns on investment in which ICT-enabled social innovation is a key component), more in-depth investigation is required into both the direct and indirect impacts of ICT-enabled social innovation on individuals (and their wellbeing and quality of life, for instance), and the 'systems effects' that can be promoted through this process.

It was also necessary to consider the unintended consequences of ICT-enabled social innovation and the network effects that can be generated, though these are difficult to capture. Single initiatives cannot alone explain the innovation dynamics triggered by the complex and multi-network processes inherent in the phenomena under investigation, in which ICTs contribute as both enabling and game-changing factors. Instead, a systems approach should be considered, which integrates a complexity theory perspective (e.g. Lane et al., 2007) and a multi-level and dynamic approach to innovation (e.g. Padgett and Powell 2012).

For this purpose, we developed the proposal for the i-FRAME as **a meta-framework**, which comprises several methodologies and approaches. These can be applied at different levels of analysis where and when appropriate, depending on the conditions available and the specific degree of detail required.

The initial version of the **i-FRAME (1.0)** is outlined in **Figure 6**. It was originally put forward for discussion at the 2nd IESI Experts and Stakeholders Consultation Workshop held in Brussels on 24-25 February 2015.

Figure 6: i-FRAME Outline – meta-framework



Source: Misuraca et al., 2015, JRC Technical Report, IESI D2.1 – i-FRAME 1.0

The review of the state of the art found that current approaches to assessing the social and economic impacts at micro-meso-macro levels of ICT-enabled social innovation initiatives promoting social innovation are limited in scope. It was therefore deemed necessary to set up a specific methodological framework. The i-FRAME can however benefit from existing methodologies and approaches that can be combined depending on the specific needs and levels of analysis.

The i-FRAME should be considered as a meta-framework which provides guidelines for using different methodologies and for building a comprehensive (computer-based) simulation model. This model, which starts from micro-simulation analysis and continues to a meso/system level elaboration, could help policy makers to devise appropriate macro/policy indicators.

To do this, the i-FRAME must be able to capture the direct effects and indirect consequences of 'initiatives' (i.e. policy/programme/project) and understand how these impact on beneficiaries, organisations, possible intermediaries, the social innovation eco-system and the welfare system in which these initiatives are embedded. At the same time, the socio-economic effects on individuals, organisations and the context of reference should be studied and related to the social service delivery models and welfare systems in which they operate.

The specific role of ICT-enabled innovations and the social nature of the initiatives under investigation should also be factored into the analysis, possibly by using quantified (and when possible monetised) indicators and variables. 'Proxy-indicators' may be used when data are not available or, alternatively, data could be retrieved from qualitative analysis and interviews with stakeholders and beneficiaries.

The initial outline for i-FRAME 1.0 also included a preliminary proposal of what operational components and techniques could be used –or should be developed- to assess impacts at a higher level of abstraction (meso and macro).

These, through the link with the operational tools developed to gather data and estimate effects at micro-meso level, have allowed the design of a theoretical model to estimate the social and economic return on investment of ICT-enabled innovation initiatives (i.e. policies/programmes/projects). A first set of indicators has also been proposed.

This framework could be used by policymakers at various levels (European Commission, Member States, regions, municipalities, etc.) to analyse (*ex-ante, in-itinere* and *ex-post*) the possible consequences of policy interventions based on ICT-Enabled Social Innovations promoting social investment.

At the micro-meso level, this implies that an analysis of the diffusion and net-contribution of ICT-enabled social innovation in social services should provide an estimation of their direct impact on perceived social value. It should also provide an estimate of the performance of the social innovation ecosystem in which an initiative (be it a policy, a specific programme of intervention, or a group of projects) is implemented.

For this purpose, a number of methodologies and evaluation techniques can be applied. First of all, baseline data and benchmark indicators need to be identified where possible through literature reviews and thematic analyses. The review of the state of the art provided an overview of the existing evidence. But this should be further developed *ad hoc* and contextualised, looking at specific case studies and scenarios of use.

The availability of sufficient quality data is a crucial aspect for the analysis of ICT-enabled social innovation initiatives and their contribution to social services reform. However, the review of the state of the art confirmed a lack of data for measuring performance and impacts of social services initiatives in general and in social innovation in particular. The development of a systematic collection process to gather micro-data is therefore essential. These data will be necessary for analysing impacts at micro level and also for 'feeding' the simulation modelling for assessing impacts at meso/macro level.

The IESI project has made great advances to set up an online platform, which includes an interactive tool for data gathering. This has allowed us to build a structured sample of initiatives, from which we can also draw case studies and scenarios of use for testing some of the operational components of the i-FRAME. In the future, however, the possibility of further expanding this data-collection process with a more data-driven approach should be explored. This may involve the development of a practical data aggregation perspective for collecting and exchanging impact data through a machine readable data formatting protocols that can capture the key data generated by various impact reports and assessments, using data available on the web for context and other system's related variables.

Additional data on perceptions, value preferences, relations among stakeholders, and agents' behaviours also need to be captured in order to better understand the implications and effects of initiatives on the social innovation ecosystem. For this purpose, a range of techniques including cost-benefit analysis and in-depth case studies, stakeholder surveys and behavioural analyses - including in particular Agent-Based Modelling (ABM) - can be performed.

Once again, how data are collected and structured is pivotal as it must allow the standardisation of information for modelling and simulation purposes. The approach for online data gathering developed for the IESI research could serve to collect information on key variables for specific evaluations and also for paving the way to more advanced simulation modelling techniques.

In addition, to elicit specific data and unknown variables of direct and indirect effects, specific methodologies based on a counterfactual approach to policy evaluation can be adopted, in an attempt to achieve what is considered the 'holy grail' of impact evaluation (i.e. to demonstrate causality in a scientifically indisputable manner). These ways of identifying the causal effect of a treatment can be found in experimental and quasi-experimental approaches.

An example is to carry out a **Randomised Controlled Trial (RCT)**, which is considered the best evaluation method for inferring a causal relationship and generally provides robust reliable evidence.[19]

However, the cost of setting up such a robust counterfactual approach to measure the causal impact of social policies and the related ICT-enabled social innovation initiatives is not only very high (when feasible), but potentially unethical.

Another way of gathering unique data and robust evidence of impact is by setting up **Social Policy Experimentations**. Social policy experimentations in fact require both designing a potentially policy-relevant intervention and measuring its actual efficacy. They test the validity of new innovative policies by collecting evidence about the real impact of measures on people. The main principles of social policy experimentations are: they bring innovative answers to social needs; are small-scale probing interventions to test impact; are made in conditions where their impact can be measured; and they can be scaled up if the results prove convincing.[20]

The new wave of EC-funded social policy experimentations initiated as part of the the **programme for Employment and Social Innovation (EaSI)** could be a fertile ground for experimentation and testing the approach proposed by the i-FRAME.

In addition to the identification of the causality relationships between interventions and related outcomes, one of the main difficulties of impact evaluation is to disentangle the complexity of the links between interventions at the micro-meso level and the broader effects at the macro level.

These effects are normally estimated by macro-economic indicators such as contribution on GDP, employment or competitiveness but do not capture the multiple and diverse effects of complex interventions.

Assessing the contribution of ICT-enabled social innovation to these macroeconomic indicators would require a much higher level of abstraction.

However, what the i-FRAME proposes at the operational level is to estimate these effects indirectly through the estimation of indicators of social value impact on the welfare systems.

To do this, a simulation model could be designed, based on alternative scenarios of use that could estimate the effects of key impact variables using forecast methods. Examples of these methods are Systems Dynamics and Agent Based Modelling which we will discuss in more depth in **Chapters 4 and 5**.

19 Randomised Controlled Trials (RTCs) are 'a type of impact evaluation which uses randomised access to social programmes as a means of limiting bias and generating an internally valid impact estimate' (according to the Best Evaluation website). However, Cartwright and Hardie (2012), in a powerful critique, point out that, by itself, a given RCT can only 'tell you that a policy worked there, where the trial was carried out, with a given population'. Their conclusion is that to be confident that a policy will work somewhere else, with a different population, the right support factors must be in place and the causal roles must be understood correctly. As Chapter will describe, the limits of RCT especially to assess impacts of policy interventions are now being recognised, especially in the social policy field.

20 See: http://ec.europa.eu/social/main.jsp?catId=1022

4 i-FRAME 1.5: the potential of dynamic simulation modelling

Summary of content of Chapter 4

This chapter discusses the structured theoretical and methodological approach proposed to building the operational components of the i-FRAME (V1.5).

It is organised as follows:

§4.1 discusses how simulation modelling can be a powerful means of addressing the complexity of the problem of evaluating the impact of social policy innovation initiatives which promote social investment;

§4.2 presents an overview of the methodological approach proposed for developing the operational components of the i-FRAME;

§4.3 assesses the potential of the approach proposed in light of insights from testing activities and peer-review.

4.1 Deconstructing social policy innovations as complex systems

The long-term objective of the i-FRAME is to become a methodological reference framework that helps policymakers and various stakeholders to better understand the effects of social policy innovation initiatives which promote social investment. In the original proposal, it was suggested that modelling and simulation approaches to complex systems could be adopted as tools to assess potential impacts of social policy innovation initiatives in an attempt to link micro, meso and macro level effects.

The findings of the second round of literature review (see **Chapter 2**) helped us to build on this proposal. They emphasised that the difficulty of modelling complex phenomena in social policies is further increased by the presence of human activities, which have an impact on the whole system and are difficult to predict and model.

Like all complex systems in general, the ecosystem dynamics of social policy innovation may lead to the emergence of new properties that do not belong to the units in the system. While the properties, interacting rules, and environmental constraints of each individual unit are usually known beforehand, the emergent properties of a complex system are unknown *ex-ante*, and manifest themselves only later in time (*ex-post*).

Understanding the potential indirect effects of a policy measure is particularly important for the primary reference actors of the i-FRAME, i.e. policy makers at EC and Member State level. At the same time, various stakeholders with different roles in the implementation of these initiatives can also use the i-FRAME to design their social policy intervention logic. The i-FRAME will help them understand how to measure and improve intended outcomes and maximise the social impacts of their initiatives.

However, this is clearly not an easy task, precisely because of the complexity of the context in which the social policy innovation initiatives are conceived. The assessment of their impacts requires a deep knowledge of the dynamics of causal relationships among relevant variables and their negative and positive interactions that are not usually linear.

In this context, **simulation modelling** could help us understand and predict future states. According to Hughes (1997), simulation modelling is useful for exploration, explanation or extrapolation. **Exploration** can be defined as the process of searching in order to discover. **Explanation** is the process of linking causes to effects in order to understand, and **extrapolation** is the process of predicting beyond the known and observed.

This approach allows us to address only those aspects of a problem that we believe are particularly meaningful. It helps us to avoid introducing details that would be useless and confusing at the level of abstraction chosen for the representation of the problem. In addition, it also reduces the structural complexity of the system.

The problem can then be depicted as a simplified framework where only the most important facts, properties, behaviours are included, organised and analysed over time.

In this respect, the expression 'over time' is a crucial aspect of a model. The goal of modelling and simulation is not to merely represent the structure of cause-effect relationships which generate the problem. Instead, the real goal is to catch the relationship between the main variables of the problem and to include appropriate hypotheses (e.g. through the use of feedback loops and/or state transitions charts) that assess the behaviour of the system (representing the problem) over time (i.e. including a 'dynamic' hypothesis that drives the evolution of the system's behaviour over time). **If this approach is accompanied by a set of appropriate indicators, it shows how the system changes, adapts and evolves over time**.

Simulation modelling can perform the following tasks:

- Identify critical functional and relational aspects of complex systems.
- Understand why a system behaves the way it does as a function of its structure.
- Inform decision-making by evaluating intended and unintended consequences of an intervention.

However, this brings with it a number of challenges that fall into three main groups:

- **Analytical**: the definition of the key variables and the cause-effect relationships amongst them requires an extensive literature review and the involvement of experts in group-modelling sessions. This is especially true in social policy innovation, where limited evidence has been provided by scientific studies.
- **Empirical**: the lack of availability of data to test the model may hamper its application. The deployment of a data gathering approach based on the development of scenarios of use that are close to reality and/or based on real case studies from the model's initial design may be part of the solution.
- **Methodological**: the validation of the theoretical and methodological approach developed for a model based on systems thinking and simulation requires consensus on what kind of case studies should be selected and analysed during the empirical activity. This can be achieved by involving experts and stakeholders and by using consolidated indicators or proxy variables as baselines when available. An additional complication can arise when typical behaviour at one level of aggregation changes in another[21].

To address these challenges, the second phase of the i-FRAME research (V1.5) aimed to:

- **Develop** a structured theoretical and methodological approach to building the operational components of the i-FRAME
- **Validate** the relationships and the dynamic hypothesis underlying the theoretical and methodological approach proposed by testing it on a number of selected scenarios of use relevant to IESI's scope.
- **Propose** a possible approach to defining and developing the operational components of a computer-based simulation model that could address all levels of analysis by using the same structural environment.

21 This means that the typical behaviours shown at micro level can form new, sometimes unknown behaviours at the upper levels, meso and macro. The way these can be connected in a dynamic manner requires complex modelling techniques based on computer simulation tools.

The main assumption underlying the proposal to use dynamic simulation modelling as part of the methodological approach for the i-FRAME is that – under certain circumstances - it can overcome the key problem of modelling and simulating policy decisions in complex social systems. **Dynamic simulation modelling enables policymakers and other relevant stakeholders to better understand the impact of a given policy**. It can therefore prevent them from being 'overconfident' in the effects specific policy designs can produce.

This is particularly important when policymakers have to analyse 'Downstream' and 'Upstream' interventions. These represent two opposite policy measures that can be considered when addressing social problems and designing policy interventions, especially when they are related to social policy and service delivery and the introduction (or not) of elements of ICT-enabled social innovation.

Downstream measures try to cope with the consequences of harm, after it has occurred. They focus on specific cases in an attempt to stop things getting worse (Coote, 2012), i.e. these measures intervene in the 'effects' of a certain event.

Upstream measures, instead, aim to prevent harm before it occurs. They intervene in the 'causes' of the problem, in order to try and stop it happening (Coote, 2012). This is particularly relevant for social investment where anticipating the possible negative consequences of a problem is preferred to repairing the problem once it has occurred.

Clearly, Downstream interventions which address structural changes in social service delivery processes are more expensive and less effective than the preventive ones. This has been demonstrated in several cases (see for example Hirsch et al., 2004 and Maggio and Pi-Sunyer, 1997). By contrast, Upstream interventions are more difficult to evaluate without any evidence-based approach that accounts for the dynamical changes of the context where the interventions are conceived (see e.g. Homer et al., 2007).

Upstream interventions have the most potential for changing population behaviours and addressing complex social problems (Raine, 2010). They can also be less expensive than the Downstream interventions when addressing restructuring policies. However, if policymakers decide to adopt one type of intervention, this does not prevent them from also using the other. In fact, a social policy that provides a good balance between the two measures produces more reliable results.

Generally, resources for the modernisation of social services tend to be scarce. Policymakers therefore try to design policy initiatives that achieve the best trade-off between upstream and downstream interventions in order to minimise costs and maximise the expected results and effects. However, the balance between these two types of measures depends on the behaviour of the stakeholders involved, and how they make their decisions is not easily modelled or simulated.

Therefore, dynamic simulation modelling is particularly useful for analysing policy initiatives because it helps policymakers and relevant stakeholders to better understand the consequences of their decisions before they happen.

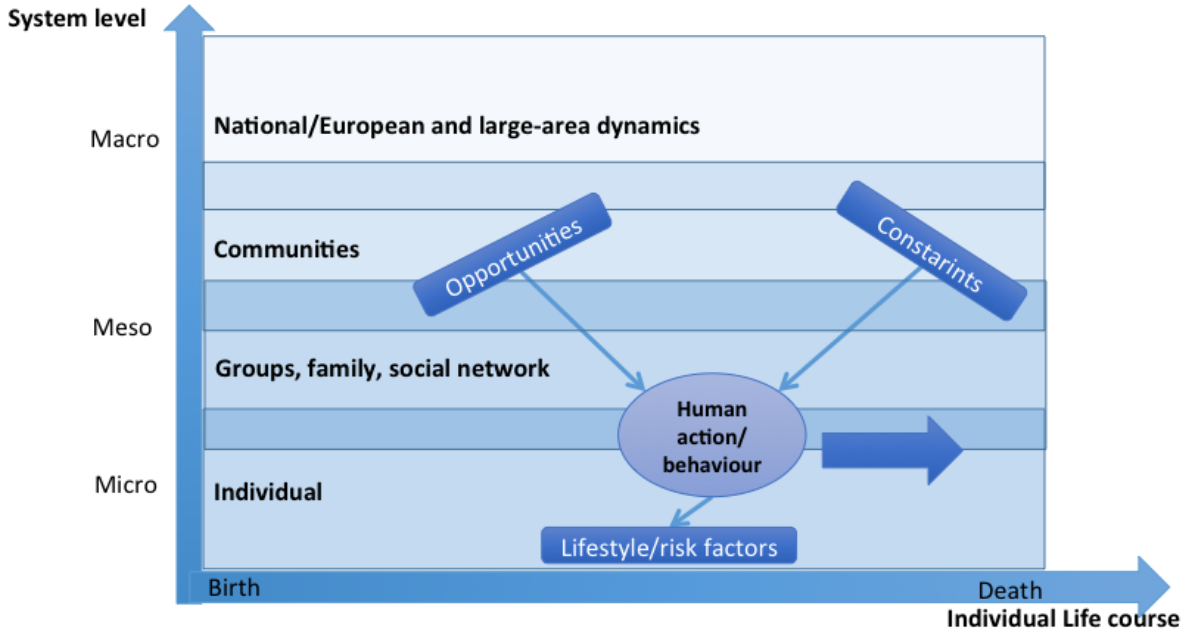
However, for the model to be an effective tool to support policy-making, several mutually interrelated perspectives should be combined; for instance taking into consideration:

- Views and behaviours of individuals acting in isolation should be combined with those of the individual as member of a given community and of the society;
- Stakeholders perspectives and behaviours at different layers of interaction;
- Effects that can be achieved in different time periods over time;
- Different layers of analysis (micro-meso-macro).

The complexity of this situation is represented in **Figure 7**, which describes the interaction of human actions/behaviour in a multidimensional space. The horizontal arrow represents the time axis for an individual's health-related behaviour and actions as he/she moves from birth to death.

During this time period, the individual interacts with a multidimensional space that represents the characteristics of the person (i.e. his/her lifestyle and related risk factors) and the external environment (i.e. the context) in which the individual lives from the micro level, to the meso and macro level of interaction.

Figure 7: Conceptual model underpinning the i-FRAME methodological approach



Source: adaptation from the work of Glass and McAtee, 2006

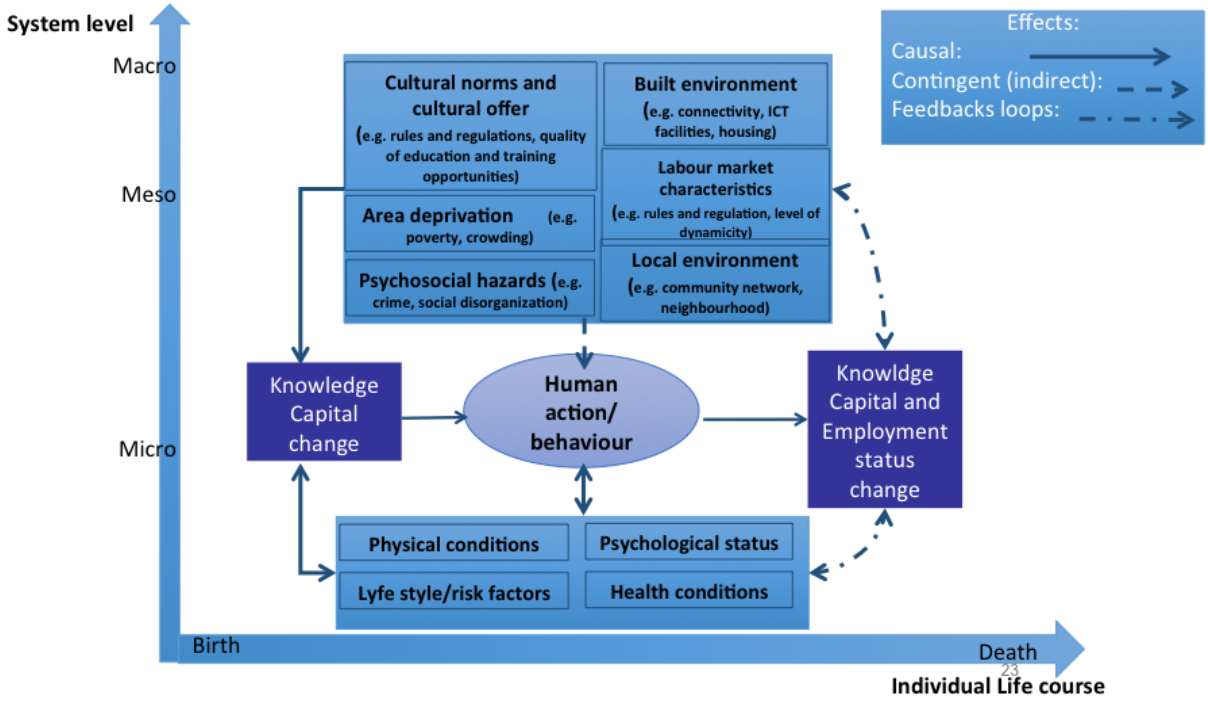
Individual behaviour is influenced by structured contingency within the social and physical environment and by lifestyle and related risk factors. Structural contingencies are represented by opportunities and constraints that are generated by the environment in which the individual lives. Lifestyles and risk factors, however, are mainly influenced by the actions and behaviour of the person. At the same time, lifestyle and risk factors can produce negative/positive effects on the individual's health status and they can also change his/her psycho-physical condition.

For instance, if we apply the conceptual model in **Figure 7** to life-long learning and the employment status of a person, this person's knowledge capital evolves throughout his/her life and it can be influenced by the micro/meso/macro characteristics of the context in which he/she lives.

Cultural norms, the structure of the cultural offer of a given context, the local conditions where he/she was born, and the psychological hazards to which he/she is subject, all determine his/her initial accumulation of knowledge capital. The psycho-physical and health characteristics of the person are influenced on various levels by the context and, at the same time, they influence the behaviour of the person and his/her choices and ability to take the opportunities offered by the context in which he/she lives. Thus, a person's life course, and also his/her knowledge capital and employment status are subject to change due to human behaviour and actions, his/her psycho-physical and health status and the opportunities and constraints which characterise the context at various levels of interaction.

These considerations are represented by the feedbacks loops in **Figure 8**.

Figure 8: Example of application of the conceptual model underpinning the i-FRAME



Source: own elaboration

This representation of an individual's behaviour/actions during his/her life course, the mutual influence between individual behaviour and the context - at various levels of interaction, and the effects of this influence on his/her psycho-physical and health condition is well-documented by studies that demonstrate the sensitivity effects of certain exposures. For example, studies of work and health show that employment status and working conditions exert their strongest influence during mid-adulthood (Marmot et al., 2001).

Exposure to social conditions, on the other hand, appears to be cumulative (House et al., 1994). Furthermore, several studies have consistently observed an increased risk of disease due to economic and social disadvantage (see for instance Hallqvist et al., 2004; Singh-Manoux, et al., 2004).

This is particularly important for the development of the i-FRAME, as it aims – when at regime – to support policy makers at European Commission and Member State level, by suggesting ways to assess impacts of social policy innovation initiatives promoting social investment. At the same time, it should also become a useful practical resource for various stakeholders and practitioners involved in the implementation of social innovations in social services, helping them to design their intervention logic and understand how to measure outcomes and evaluate the social impacts of their initiatives.

4.2 i-FRAME Decalogue: experimenting with system dynamics

The example discussed above (**§4.1**) suggests that social policy innovations promoting social investment can be studied as complex systems[22], according to the conceptual model presented. Complex systems can fairly represent all the situations in which social policy innovations affect the welfare system, especially with regard to the design and/or delivery of PSSGIs, given the personal nature of these services.

As we have emphasised above, social policy innovations, especially when ICT-enabled, can act directly on a person by changing his/her psychophysical and health conditions; these in turn can influence his/her behaviour and actions. At the same time, they can act indirectly on the person's behaviour, by modifying the context in which he/she lives, by changing opportunities and releasing constraints that, in-turn, can affect his/her actions and behaviour as well. All these situations take place during a person's life course.

This complexity, which contains many causal relationships, feedback loops and non-linearity along the temporal axis can be modelled and simulated by using dynamic simulation models such as System Dynamics (SD) and Agent-Based Modelling and Simulation (ABMS). This is confirmed by the literature review and in particular by the comparison of different complex systems methods and modelling techniques (see **Chapter 2** and **Annex I**).

Testing and validation of i-FRAME 1.5 resulted thus in the suggestion that these two methods should be combined to produce what we have called: the **'Dynamic Simulation - Hybrid Model' (DS-HM)**.

DS-HM emerged as a potentially powerful methodology which could address all the specificities and complexity of evaluating the impact of social policy innovation initiatives promoting social investment in PSSGI delivery. The ABMS component of the DS-HM can model the dynamic characteristics of each individual in the target population and simulate their behaviour during their life courses. The SD component can represent the complexity and the dynamic of the context in which an individual operates. It can show how this context evolves over time due to the interaction among different layers of the system. These interactions are represented by causal relationships and feedback loops that can interact with the behaviour of the individuals.

Recognised experts in the field (e.g. Borshev, 2013) have argued that the hybrid approach to modelling and simulation is preferable to other methods for a number of reasons.

Firstly, the SD-based structure represents a well-defined paradigm that includes high-level perspectives and gives a high-level abstraction of the problem. In the language of stocks and flows, the general logic of the system is immediately clear. It is easily understood and depicts possible counter-intuitive situations.

Secondly, a pure SD approach does not immediately show the behaviour of single classes of objects (people, means, sub-structures) involved in the problem. In other words, it does not show the effort needed to take into account possible behaviours of single classes of objects that are part of the problem. This requires the introduction of other structures (arrays of stocks and flows) that tend to complicate the overall model.

Finally, a pure ABMS approach is sometimes difficult to apply to general macro behaviours. Because the ABMS paradigm is based on a bottom-up approach, it focuses on the details of each single class of agents. The macro properties and dynamics of the whole system which depict the problem are often lost at the first glance at the structure of the model. These may become evident only *ex-post*, as a result of the simulation.

22 A complex system is adaptive to changes in its local environment and in general it is composed of other complex systems, behaves in a nonlinear fashion, and exhibits emergent behaviour (Padula et al. 2014).

Therefore a Hybrid Modelling approach, which combines SD structures with ABMS features, was considered as a feasible development of the i-FRAME proposal. This approach has the following advantages:

- It captures both high-level structures and single agent behaviour;
- It depends on both (agents') behaviour and structures;
- It uses both stocks and events as sources of the dynamics of the problem;
- Finally, since the macro properties of the system emerge from the interaction of agents, the use of 'heroic assumptions' is reduced as it is limited and confined to the general structure of the problem (the related system).

However, as the specific review of the state of the art in modelling and simulation clearly showed, a general model which includes all the elements of any single component of a complex system does not exist. Thus, any attempt to build a general simulation model to study, assess and evaluate the effects (i.e. the outcomes and impacts at different levels of scale: micro, meso, macro) of a specific policy initiative would not produce any valuable results.

As the literature underlines, a simulation model should start from a 'well-defined and specific problem' that in turn has its own specific characteristics and properties (for all see: Sterman, 2000). These characteristics must stem from both the context of the problem identified and the experience and knowledge of the problem's stakeholders.

In other words, we must discard the idea that we can model a general system applicable to any identified subject. We can only model a specific problem and, starting from that problem, we can model the system to which the problem belongs. In so doing, we must take into account the fact that the higher the number of appropriate contributions made by proactive stakeholders, the more effective the model will be.

A simulation models is driven by a specific problem and should be conceived and developed to explain this problem. In this perspective, the system represents the set of components surrounding the problem to be modelled in order to understand the dynamics of the surrounding environment where the problem is formed, fed and generates other effects.

The validation activities carried out demonstrate that the i-FRAME methodology is able to support the development of simulation models for a problem which is both well-defined and contains the main key points to be used in any practical simulation applications.

The methodological approach proposed was further developed and tested with the support of dynamic simulation modelling techniques, which were applied to case studies and scenarios of use and led to the i-FRAME 1.5.

The key activity was first to break down complex problems into domains and then into domain-related sub-models. These are simpler and easier to understand for domain experts, stakeholders and policymakers (Misuraca and Kucsera, 2016).

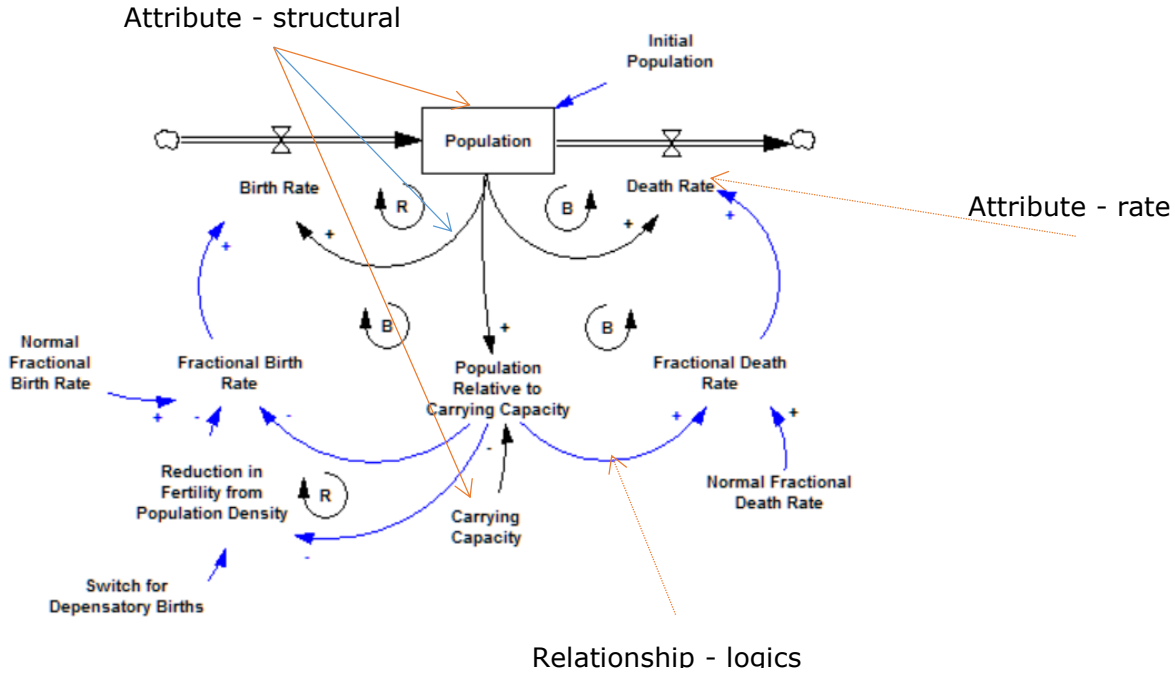
In this connection, the review of literature on dynamic simulation applications in the social policy areas addressed, led to the identification of the following main domains:

- **Relevant population:** this sub system depicts the behaviour of relevant populations (e.g. needy families living on subsidies; people with chronic diseases; unemployed vocational college students; etc.).
- **Investment and financing:** this sub system includes aspects and indicators for evaluating the financial and investment aspects of a problem (e.g. use of social impact bonds; establishing private public partnerships; etc.).

- **Impacted domains:** the sets of aspects that drive and change the domains that are impacted by the social policy innovation initiatives (e.g. labour market; economic development; industrial sector; occupational life course; etc.).
- **Service delivery system:** the sets of aspects that drive the related sub-system providing services to the relevant population (e.g. social security; care; education; etc.).

The general structure of the domain 'relevant population' can be represented using a System Dynamics model, see **Figure 9**.

Figure 9: Example of a System Dynamics model of 'relevant population'



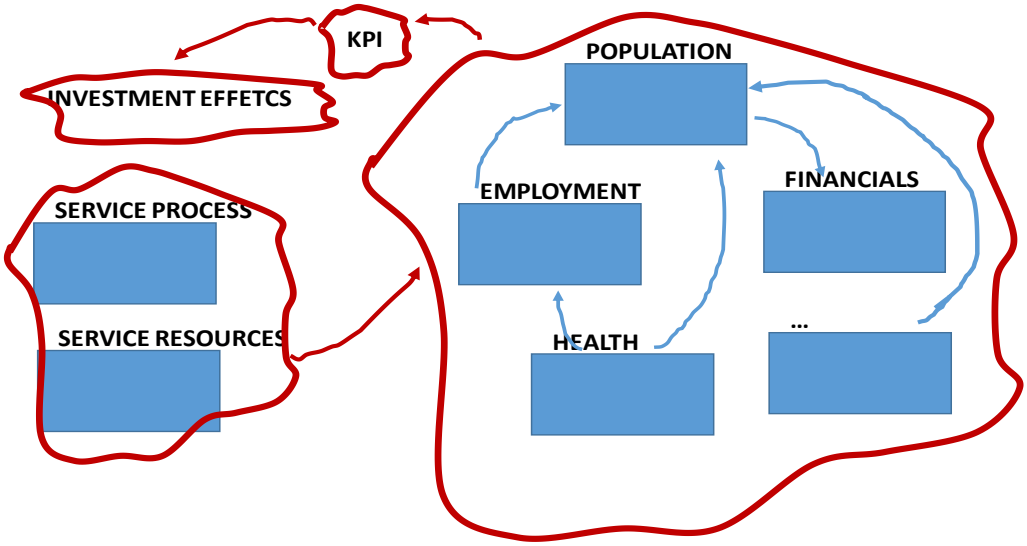
Source: Fair Dynamics elaboration for JRC on a J. Sterman model

Each domain contains the outcome/impact indicators and can be defined as **impacted domain**, as it receives the effects from the other more 'scope-specific' domains that can be called **impacting domains**. These impacting domains contain the resources that deliver the services that affect the 'impacted' domains.

For simulation modelling purposes, the main focus has to be on capturing and depicting the structure of the impacted domains. Usually, the impacting domains are represented by collections of variables acting on the elements of the impacted domain. In practice, this means that each domain-related sub model is based on its own internal structure, which according to Sterman (2007) can be represented through a set of attributes and methods, where the attributes represent the variables and can be appropriately divided in Structural, Logical and Key Performance Indicators (KPIs).

Depending on the simulation methods used, these attributes and methods may be further subdivided into technical sub categories and cross comparisons, for example variables and indicators. The final model will result from the aggregation of different domain-related sub models, depending on the specific context, as depicted in **Figure 10**.

Figure 10: Example of 'domain-related sub-models of a System Dynamics model



Source: Fair Dynamics elaboration for JRC

Building on the assumptions and key aspects introduced above, the practical steps for implementing the proposed methodology for modelling and simulation of complex systems can be summarised by the **i-FRAME 1.5 Decalogue** presented below.

1. **Start from a definition of a case/problem/need**, and reconstruct the logic model which defines how the case/problem/need is addressed by the social policy innovation initiative (see e.g. Epstein and Yuthas, 2014).
2. **Define the levers for output, outcome and impact assessment** according to the logic model identified in Step 1, and identify the indicators for impact, outcome and output assessment according to the levers defined.
3. **Identify the impacted and impacting domains of the case/problem/need and how they are addressed by the social policy innovation initiative**. This could be done by developing Causal Loop Diagrams (CLD) that help us to understand the main cause-effect relationships of the problem under examination (Sterman, 2000; Forrester, 1994).
4. **Check whether any similar dynamic simulation models have already been developed** (cases available in the literature and scenarios of use to be developed as part of the i-FRAME Web Platform).
5. **Look for and check the Attributes and Methods for each domain-related sub-model** of the existing dynamic simulation model, and adapt them according to the case/problem/need addressed by the initiative.
6. **Improve the dynamic simulation model** adding the domain-related sub-model not already included in the existing dynamic simulation model selected from the existing ones, and complete the logical representation of the case/problem/need addressed by the initiative. To this end, develop a methodological pathway in dynamic model development that combines qualitative (Causal Loop Diagram) and quantitative (stocks and flows/agent based models).
7. **Adapt and improve each domain-related quantitative sub-model** (Stocks & Flows Diagram and/or state charts with analytical description of the state transitions) also through Group Model Building (Vennix, 1999; Zeigler et al., 2000; Vanden belt, 2004), and combine the sub-models in the final dynamic simulation model representing the case/problem/need addressed by the social policy innovation initiative.

8. **Define the conditions for each scenario to be studied**. To this end aggregate approaches (i.e. hybrid models) can be used to father data and information on a specific policy problem, and to build consensus around challenging issues.
9. **Analyse the scenario through different experiments** (by changing the internal levers of the model). This would facilitate presentation of results from alternative scenarios, engaging policymakers' and stakeholders' to concentrate on feedbacks and develop an endogenous perspective of the policy interventions and their impacts.
10. **Compare the scenarios and make policy recommendations**.

Of course the above steps should not be considered as the 'perfect scheme' for achieving the rather ambitious objective of assessing the impact and making recommendations for designing and evaluating social policy innovations. However, they can provide valuable support to stakeholders and policymakers, which together with assistance from domain experts, can help them to achieve realistic impact assessment for a given policy relevant initiative. They can also provide general hints on how to identify all the elements needed to describe the problem in its full complexity.

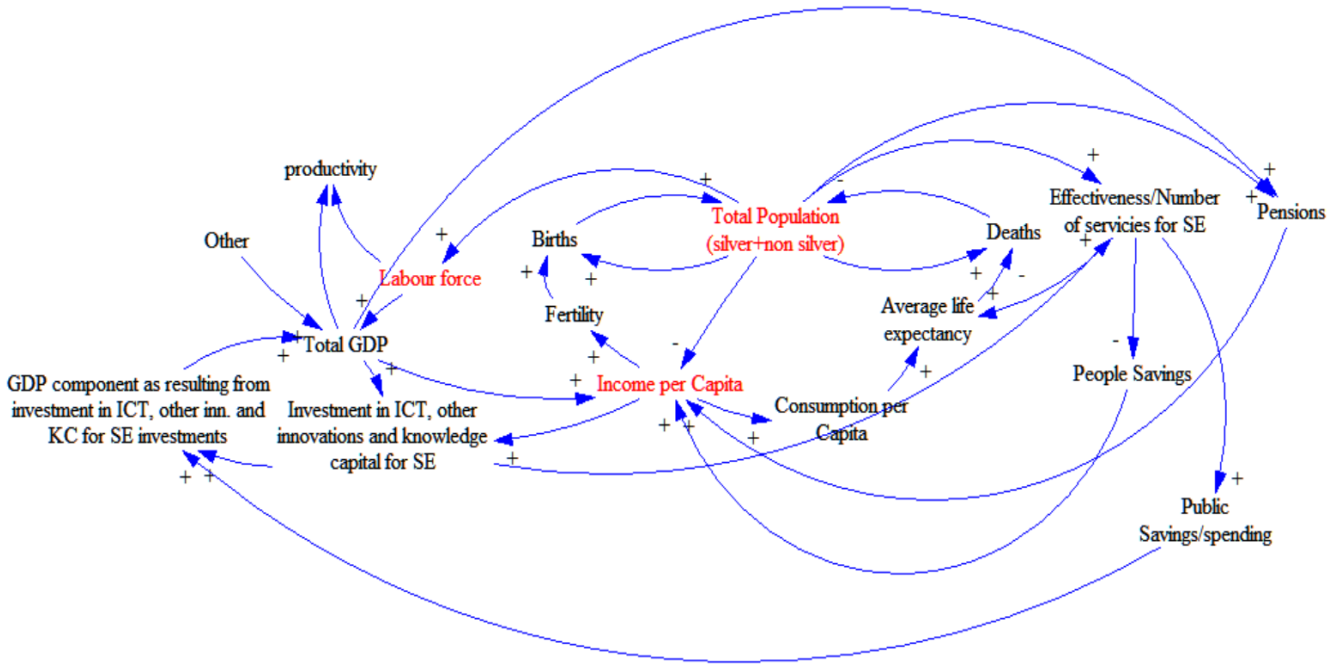
In this respect, it must be noted that this methodological approach should be considered circular and reiterative rather than sequential. It requires a greater involvement of domain experts, stakeholders and policymakers. It is therefore important to foresee the implementation of a **structured Group Model Building (GMB) approach**, together with the application of the proposed i-FRAME methodology. The main objective of GMB is to enhance knowledge within the team and bring out and share mental models across all the stages of problem modelling and simulation (Tako et al., 2010). Different methods can be used to engage the various actors in the modelling and simulation process, such as a structured series of workshops or policy lab sessions, also depending on the level of interaction of the two typologies of actors (Stakeholders and Domain Experts), following the various steps of the proposed i-FRAME methodology.

In order to give a more practical idea of how the i-FRAME methodology could be applied, we describe below an SD model developed by Sutrisno and Handel, (2011) to understand the socio-economic impact of demographic changes in the German population. In this example, the methodological steps of the i-FRAME have been applied as follows:[23]

- **Describe the problem/case/need**: the impact of increasing numbers of ICT-enabled services on the ageing population.
- **Define the levers for output, outcome and impact assessment according to the logic model**: resources allocated to ICT-enabled initiatives which promote social services for ageing – functioning of social services provided to older people – cost and quality of services provided – benefits for elderly population (e.g. increase of healthy years) – impacts on welfare system (e.g. reduction of care cost and social security savings).
- **Identify the main domains**: Relevant Population, Employment (Jobs), Financials, etc.
- 4&5. Check the literature for existing Models, Attributes and Methods: Sutrisno and Handel, (2011).
- 6,7&8. Adapt and improve each domain/sub-model; combine the sub-models and define the levels for output, outcome and impact assessment. The application leads to the illustrations reported in **Figures 11** and **12**, where are reported as a Causal Loop Diagram, while Stock and Flow Diagrams and state charts - step 6 of the i-FRAME 1.5 methodological approach - have not been developed for this example.

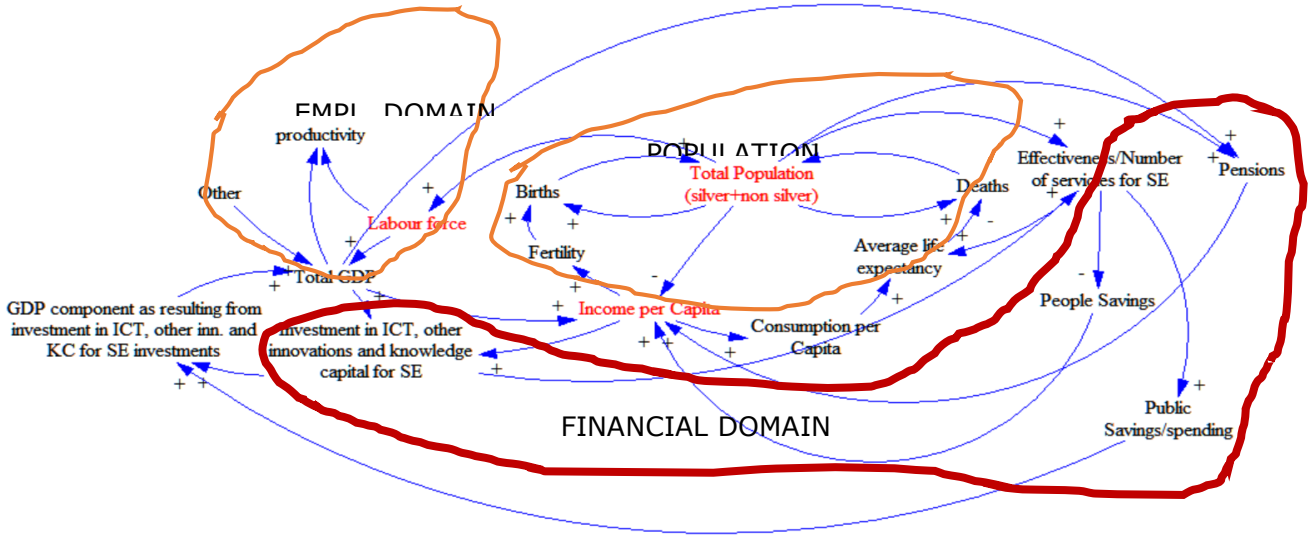
23 Steps 9 and 10 of the i-FRAME methodology have not been applied, as they would require the availability of a computer-based simulation model.

Figure 11: Example of a dynamic simulation model (in a CLD) assessing the impact of ICT investments on ageing



Source: Fair Dynamics for JRC, adapted from Sutrisno and Handel, (2011)

Figure 12: Domain–related sub-models of a dynamic simulation model (in CLD) assessing the impact of ICT investments on ageing



Source: Fair Dynamics for JRC, adapted from Sutrisno and Handel, (2011)

4.3 Insights from testing, validation and review of i-FRAME 1.5

The results achieved during the development and testing phase of the i-FRAME 1.5 included the findings from an *ad hoc* analysis of the state of the art and review of literature, which showed that the application of dynamic simulation modelling, especially to social policies and ICT-enabled innovation initiatives, has been limited. This was confirmed by the results of the testing and validation activities, which also demonstrated that social policy actors have little experience and capacity in implementing scientific methodological approaches to assess the impacts of social policy interventions.

The proposed **i-FRAME 1.5 methodology** was designed as a structured approach which identifies the actions that should be followed to shape a dynamic simulation model of the impacts of social policy innovation initiatives which promote social investment. As demonstrated in the validation process of the i-FRAME methodology, the circular nature of the 10 steps which compose the i-FRAME Decalogue facilitate consensus building on modelling the structure of social policy innovation initiatives and their expected impacts on target beneficiaries in quantitative and less subjective ways.

The proposed methodological approach was tested by applying it qualitatively to different scenarios of use. Concrete case studies of ICT-enabled social innovation initiatives in different welfare systems across the EU, each addressing different combinations of Personal Social Services of General Interest (PSSGI), were conducted.

In addition to this, to further demonstrate the validity of the methodological approach underpinning the i-FRAME 1.5, and also to test it quantitatively, the simulation modelling approach proposed was applied to a real-life case. We chose one of the ICT-enabled social innovation initiatives that belong to the IESI mapping sample: **Pathways Accommodation and Support System (PASS)**. Pass is a shared client support and bed management system for homeless services, and forms part of the priority actions in the National Homeless Strategy in Ireland.

PASS improves the planning, delivery, monitoring, and coordination of services across various agencies from the public and third sectors. The data collected are linked to profile data, assessment of housing and support needs of homeless people, ongoing support planning; engagement with accommodation, outreach and day services, and reasons for departure.

The system was launched in the Dublin region in 2011 to prevent homelessness, reduce the duration of homelessness to less than six months and ensure the delivery of services for homeless people that meet their needs. All funded services addressing homelessness are required to use PASS under Service Level Agreements (SLA).

This case is very complex, as it implies numerous situations which interact with one another. To test the i-FRAME methodology, a simplified model was prepared to capture the main effects of the PASS system on a homeless person's transition from initial 'emergency accommodation' to more stable accommodation.[24] The model developed is coherent and reproduces over time data officially published by the Dublin Region Homeless Executive (DRHE).

Figure 13 displays a Causal Loop Diagram featuring three main stocks in the model: homeless people, people in emergency accommodation, and people in other accommodation. The flow rate is based on the support capacity of the system variable – i.e. transitional support capacity - which influences the rate at which people go from emergency accommodation to other accommodation.

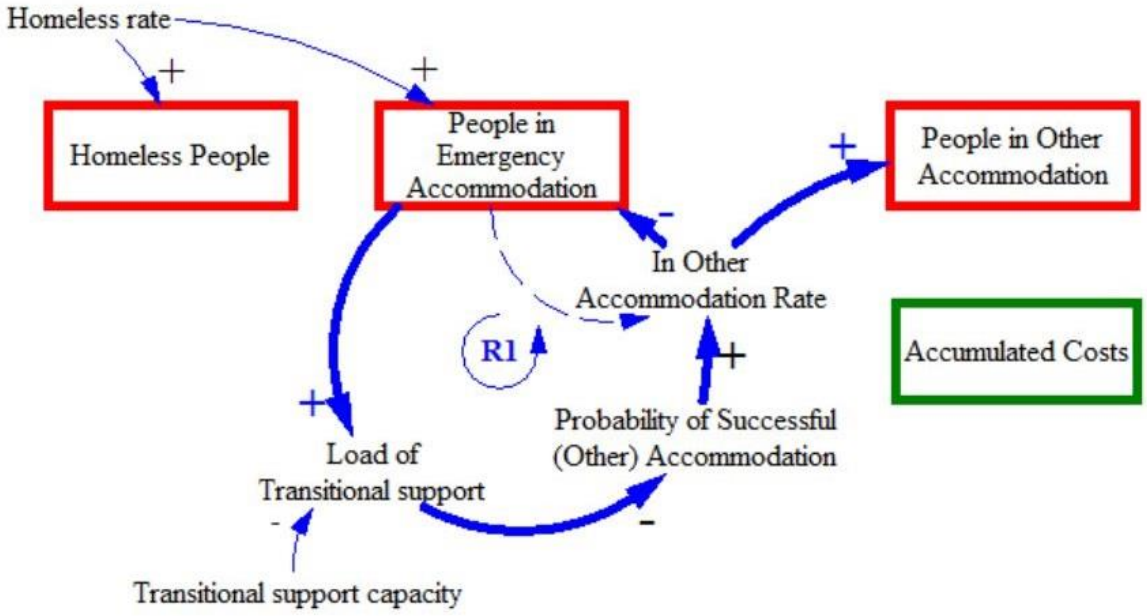
The whole dynamic mechanism of the model is based on the variation in the probability of success in transferring people from emergency to other accommodation. This may depend on the load of support that, in turn, depends on the PASS's transitional support capacity. In other words, the PASS system influences transitional capacity, i.e. the number of 'figurative' operators providing the service and the 'Load' of the Support offered.

24 The model includes impacted domain-specific sub-models (i.e. relevant population, social housing delivery, care service delivery, financing of the intervention and labour market).

The model captures the dynamic relationship between the support capacity of the services offered through the PASS system (transitional) and the rate of homeless people going into each type of service. The logic of the reinforcing loop is:

People in emergency accommodation → Load of transitional support (affected by the PASS system through the change of the support capacity) → Probability of success → In Transitional rate → People in other accommodation. The support capacity of the service underlies the loop.

Figure 13: CLD model of simplified PASS-like case



Source: Fair Dynamics elaboration for JRC

To validate the model quantitatively, the simulation modelling of the PASS-like model used data from the Homeless Agency Partnership (2008). A Group Model Building Approach was also used to present the dynamic simulation model of the PASS case during an Experts Workshop at JRC-Seville in July 2015.

Figure 14 shows the stock and flow diagram used for the PASS-like simulation modelling application. The first stock represents homeless people in the Dublin area.

Thanks to PASS, the end beneficiaries of the service can move to the stock of people in emergency accommodation, the first type of accommodation provided. The transitional service capacity, fed by the PASS system, influences the number of homeless people who can enter the 'other accommodation' status.

Accumulated costs represent the budget allocated to provide the services.

The flows represent the rates of people going from one stock to another.

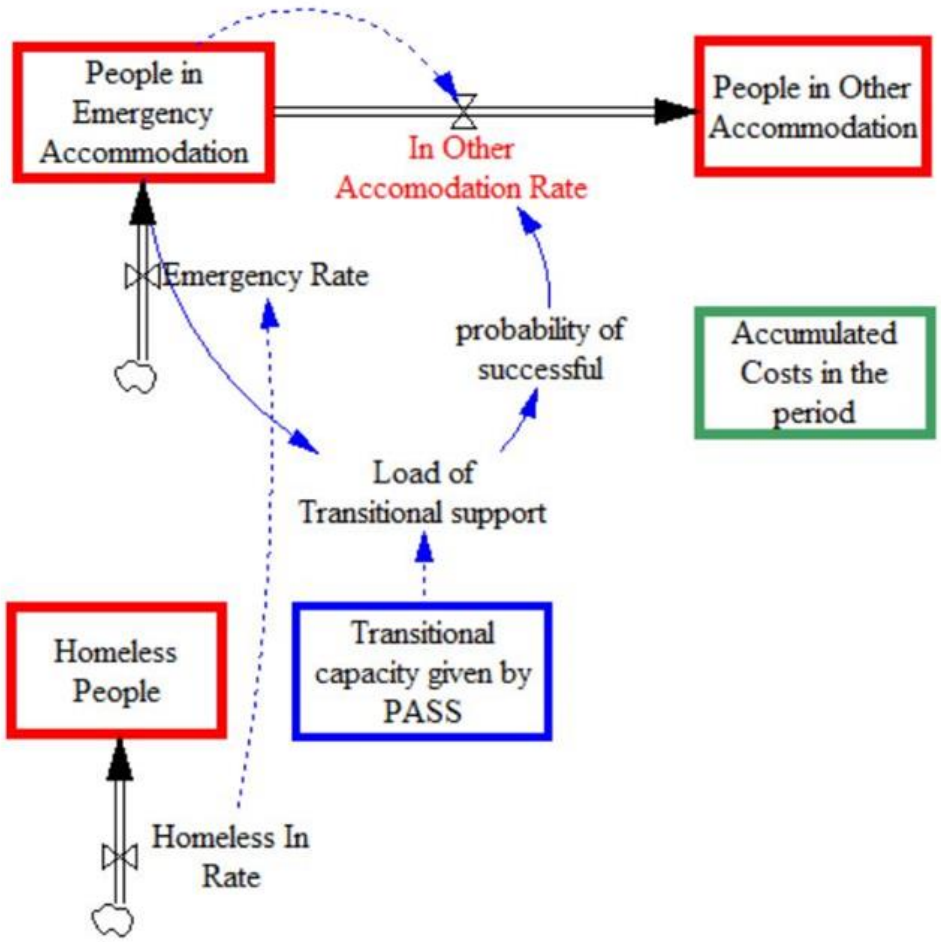
Homeless people-in rates indicate the share of the population that becomes homeless.

The emergency rate regulates the flow of people going into emergency accommodation.

The other accommodation rate regulates the flow of people going from emergency to other accommodation.

In this case, ICTs act as enablers that increase the number of figurative operators providing and coordinating services, which, in turn, increases the probability of success: more people moving to housing from emergency accommodations.

Figure 14: Stock and Flow diagram of PASS-like model



Source: Fair Dynamics elaboration for JRC

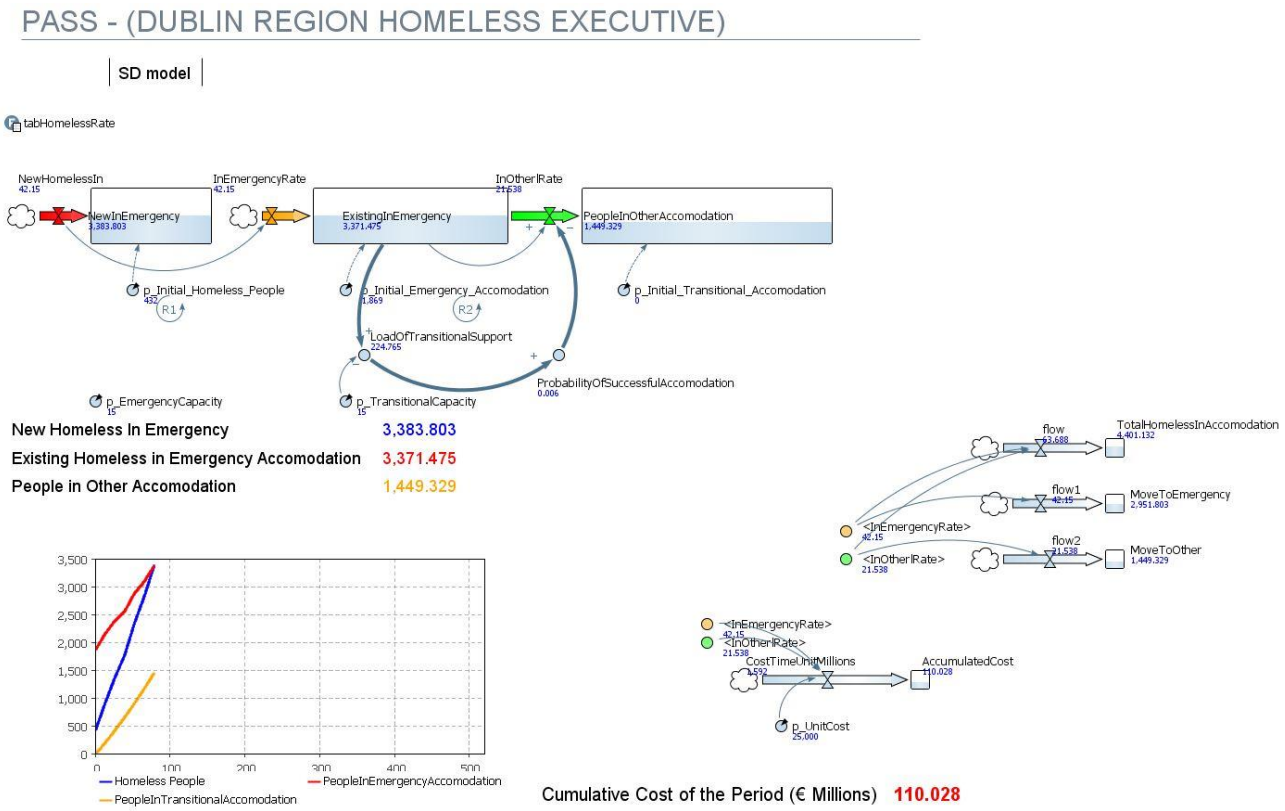
The levers that regulate the flows used to calibrate the model are:

- (Q1-2014) New homeless people in emergency accommodation at baseline (437).
- Existing homeless people in emergency accommodation at baseline (1,869).
- Transitional support capacity, measured by the number of figurative operators affected by the PASS system (15).
- Homeless rate, measured by the number of homeless people per week (from the case documentation).
- Unit cost, measured by the cost per homeless person per week (25,000€) adjusted to a coherent value for the delivery of the service following discussion with experts.
- The time period used to run the model is 78 weeks from Q1-2014 to Q3-2015.

By using the levers with the above values, in this timespan, the number of homeless people amounted to 3,383, of which 3,371 were in emergency accommodation and 1,449 were in other accommodation (assuming 0 at baseline, Q1-2014).

Figure 15 shows the output of the simulation modelling of PASS.

Figure 15: Output of simulation modelling of PASS



Source: Fair Dynamics elaboration for JRC

The quantitative validation of the PASS scenario indicates that this approach could be used for simulating the impact and the functioning of a given policy action involving ICTs as enablers in services planning, design or provision. Furthermore, the proposed approach is also useful for simulating the impacts of different policy options. For instance, experimenting with the levers used for the simulation model shows that, even after changing the number of operators in the system, the probability of success reaches an upper limit over time and the number of beneficiaries no longer increases.

In this simplified simulation, the effect of ICTs is represented by an increase in the figurative number of operators, which leads to an increase in both the efficiency and effectiveness (probability of success) of the initiative. By decreasing the 'load' or increasing the number of figurative operators, the 'probability of success' increases and the 'time to move to housing' decreases, making the social intervention more efficient and effective.

Applying the i-FRAME approach to PASS shows the effectiveness of this intervention for the planning and execution of the services. The real-time tracking of homeless people and the availability of beds made it possible to increase bed occupancy to 99%, thanks to the sharing of information between all agencies, other stakeholders, and volunteer organisations. This ensured efficient use of available resources and reduces duplication of efforts.

The results from the simulation confirm the estimates of the impact assessment conducted by The Dublin Region Homeless Executive (DRHE) using data provided by the PASS system.

The introduction of PASS has allowed the local government to make timely use of the information generated to manage, monitor and evaluate the services efficiently. PASS provides statistical information on the homeless people's profiles and their use of services that is useful for assessing the effectiveness of the strategy, identifying emerging trends and monitoring service delivery. Every record is unique and tracks a homeless person's progress, and assesses his/her income, employment, training, education and health needs.

Service delivery is improved through the shared information system that allows agencies and other stakeholders involved in service provision to track and share tasks and provide a care continuum and integrated service delivery. The statistics provided can be used to plan future service developments and monitor the quality of the services delivered. They also provide insights into the challenges of homelessness, by profiling the characteristics of homeless people using the services, and contributing to a reconfiguration of service provision to fulfil long-term strategic policy objectives.

The initiative thus helps to optimise the use of financial and human resources so that an essential required service to any household experiencing homelessness can be delivered, while at the same time overall costs of homelessness for society are reduced.

Statistics show a significant improvement in the number of individuals who moved into independent living accommodation and became integrated into society with full-time employment and improved health. This initiative was thus highly preferable compared to earlier approaches which aimed to get people 'housing ready'.

The results of the this phase of the research showed that **dynamic simulation modelling can make a considerable contribution to our understanding of complex social systems**. More specifically, the literature review and the analysis of the state of the art of the application of such approaches in the field under investigation, demonstrated that exploiting the capabilities of Systems Dynamics (SD) and Agent-Based Modelling Simulation (ABMS) in a Hybrid Approach seems to be the most promising option for modelling and simulating complex systems such as ICT-enabled social innovation which promote social investment.

The analysis also demonstrated that, **without a structured methodological framework like the i-FRAME, the dynamic simulation approach cannot be easily implemented**, because it would require a high level of expertise, and also because it would be expensive.

The proposed methodology suggests that a structured approach to Dynamic Simulation would instead significantly reduce the cost. At the same time, through a sort of 'standardisation', it would also help to engage policymakers, relevant stakeholders and domain experts in the dynamic modelling and simulation process of a specific problem. Though each problem that needs to be modelled and simulated presents its own specificities and peculiarities that cannot be generalised, the proposed methodology clearly shows how to reuse already developed models, with significant savings in time and costs.

The i-FRAME methodology allows us to represent problem-solving as a circular process that first defines the problem and then simulates the impacts of given policy measures. All the policy actors and domain experts participate actively in both shaping the problem into a dynamic simulation model and defining the most suitable policy instruments. This shall contribute to maximising positive impacts of the planned policy actions on the target beneficiaries.

The encouraging results of the qualitative and quantitative validation process and also the interest stakeholders have expressed in using the i-FRAME methodology clearly open the door for **more extensive and systematic implementation of the proposed methodological approach**. This would support policy actors in simulating *ex-ante, in-itinere* and *ex-post* impacts of initiatives where ICT-enabled social innovation plays an important role in the governance and delivery of social services.

However, **it would be *naïve* not to also consider the main problems that modelling and simulation approaches have**. Several approaches based on modelling and simulation and how they are used provide evidence of social-economic impacts of policy initiatives are described in the literature. However, it is well known that solutions generated by a model are not the solutions to the problem that could be generated in the real world environment, were we able to control all the independent variables (Rainey 2004, Ackoff 1999, McHaney 1991, Neelamkavil 1987).

How good the solution(s) generated by a model is/are will mainly depend on whether we:

1) Can understand the problem;

2) Have the expertise to make the right choice of modelling technique;

3) Know how to use these techniques properly;

4) Can set up a proper validation process; and

5) Have the considerable resources and time needed to create a model of complex system.

Moreover the characteristics and features of complex systems are not 'fixed' or static, and can be grouped into two categories: those that are evident at the elemental (micro) level of the system, and those that are observed at the macro-level.

Complex systems normally have a large number of elements, a certain number of relations (interdependence), and a set of shared rules by which they operate. All these features lead to a larger set of properties at the micro-level of the system.

At macro-level, there are two sets of characteristics. First, there are the observable phenomena, which are related to the emergent capability of complex systems, in which patterns at the macro level that cannot be inferred by simply analysing the parts in isolation. Second, complex systems have properties, such as resilience, robustness, non-linearity, flexibility, and fitness (Couture, 2007).

Reviews of the approach proposed suggest that, in light of the results achieved, the i-FRAME initiative has the potential to significantly improve the quality of modelling for social policy innovation initiatives and beyond. It can add real value to national and local initiatives and thus, indirectly improve the lives of EU citizens. Although this framework was intended specifically for the evaluation of ICT-Enabled Social Innovations, its importance is much wider: a framework of this kind could be adopted to improve and complement the use of computer modelling for policy purposes throughout the EU.

The i-FRAME approach has been developed in parallel with standards elaborated by national governments for policy modelling and analysis (e.g. the UK and the Netherlands). The relevant lessons from these different attempts should be included in the further development of the i-FRAME. If the standards and frameworks adopted have greater consistency with each other, they will probably exert a greater influence on how policy modelling is done across the EU.

The i-FRAME proposal includes the establishment of a library of models that can be adapted and reused. However, in order for models to be effectively reusable, high standards of development and documentation are needed. In the past, models have been very difficult to reuse partly because their development was rushed. However, persuading policy clients to spend the necessary time and resources to allow good model structuring and documentation has also been difficult. This conflict needs to be addressed and the further development of the i-FRAME could make a contribution in this direction. The i-FRAME identified the difficulty policy actors and modellers have in working together, and proposed a sensible 10-stage framework to help structure this. In addition, experts involved in the validation of the i-FRAME believe that this framework is timely and necessary and should be further developed. This could save time and money, and the emergence of reference models may encourage comparable project evaluation across the EU.

The i-FRAME also envisages the development of an interface to guide policy actors through the process of specifying an evaluation model. An interface that fully covers this process will be difficult to achieve due to the large variety of needs, contexts, techniques and availability of data. However, an interface that aids this process, by providing prompts and guidelines, is highly desirable. This interface should be clearly distinguished from other evaluation models that may be developed.

The studies carried out to develop the i-FRAME 1.5 also rightly pointed out that a variety of modelling techniques may be appropriate in different circumstances, and proposed hybrids of System Dynamics and Agent-Based Models. They also suggested that statistical models should be included. Adherence to traditional schools of modelling should be abandoned.

Instead, an open and pluralistic approach is recommended whereby each aspect of a model is chosen and justified according to the modelling needs and situation.

Though the i-FRAME accepts the importance of being able to monetise the impact of projects to support the case for their funding, it also recommends a multi-dimensional assessment using a variety of techniques. Guidance as to how these various techniques and elements can or should be combined could be further substantiated in the next versions of the i-FRAME.

More importantly, initially the i-FRAME assumed there was a particular purpose for modelling, namely: to assess the impact (direct or otherwise) of initiatives or policies. This is what policy actors often say they want before going through the modelling process.

However, **there is a wider range of purposes for modelling** which often turn out to be the real goal in these situations. Much confusion, wasted effort and the failure of modelling projects have resulted from the precise purpose for modelling not being established. It was therefore strongly recommended that these different purposes are recognised and included in the next versions of the i-FRAME. They include:

- **Predicting** the impact of variations of policy or intervention;
- **Understanding** the complex interactions that might occur;
- **Explaining** the observed outcomes of an intervention;
- **Illustrating** the impact of an intervention for the purposes of presenting a project;
- **Performing a risk analysis** of the ways in which projects may deviate from their intended outcomes, in order to inform monitoring and management;
- **Providing a policy 'flight simulator'** to train policy actors and sharpen their intuitions;
- **Eliciting evidence**, as part of a cycle of extracting knowledge from experts and stakeholders.

For these reasons it was proposed that in the further development of the i-FRAME, **guidelines which relate these different purposes to the different techniques available should be drawn up**. The modelling technique chosen and the amount of effort made will strongly depend on the model's purpose. This is especially true when policy actors are included in the design and need to learn how to use models and when modellers need to be involved in the policy cycle.

Moreover, **the importance of independent validation of models must be underlined**. It is very easy to fool oneself with a plausible model which seems to behave in the right way. However, one can miss factors that turn out to be crucial or one can make an unreliable assumption. If model results are to be used to make costly decisions, then good specifications and verification methods are not enough to ensure that the model is sufficiently robust and reliable. In particular, whilst stakeholder validation is sufficient for some purposes for many others it is not. Guidance on the range of validation techniques and when they are needed should be included in future versions of the i-FRAME.

5 i-FRAME 2.0: pluralistic evidence-informed policy-making

Summary of content of Chapter 5

This chapter presents the final proposal for developing a methodological framework to assess the social and economic impact of social policy innovations which promote social investment - i-FRAME (V2.0). It is organised as follows:

§5.1 discusses how the findings of the supplementary systematic literature review conducted in the last phase of the research have improved the theoretical orientations which underpin the i-FRAME.

§5.2 presents the revised methodological approach and operational components proposed to develop a comprehensive framework for evidence-informed social policy innovation – i-FRAME 2.0;

§5.3 provides an overview of the research underway to build the prototype of some of the operational components proposed for developing a computer-based simulation model and web platform for social impact evaluation

5.1 Conceptualising and contextualising social policy innovation

As anticipated in **§2.2**, the IESI research progressed from its exploratory phase and widened the scope of the analysis in order to consider the broader concept of **social policy innovations which promote social investment**, of which ICTs form an important component. This was prompted not only by the findings from previous reviews and consultation with experts and representatives of stakeholders, but also by the need to investigate the possibility of applying the i-FRAME to other policy fields.

Within this context, **social policy innovation** refers to *'social investment approaches that provide social and economic returns. It is linked to the process of modernising social protection systems and redesigning social service delivery through innovative systemic reforms, where ICTs generally play a key role'* (Misuraca et al. 2017c).

The main focus of the analysis is on social policy and services innovation that can also be defined as *'the design, production, and provision of PSSGI addressing the needs of individuals throughout their lives, through the reconfiguration or recombination of practices across the value chain (upstream, midstream, and downstream)'.* This builds on a previous definition of ICT-enabled social innovation proposed by the JRC (see Misuraca et al., 2015).

A typology has been derived from this definition, using the three dimensions described below:

- **Upstream: the extent to which the underlying policy is reconfigured**. For instance, conceptual innovation and new sources of evidence may define new needs and/or new target users and redesign services. In addition, changes in policy orientation and policymakers' objectives may introduce new financial instruments and even redefine the regulatory framework. This dimension can take two values (low or high) depending on whether changes are only at the conceptual and design level or whether they go all the way to new objectives, funding, and rules.
- **Midstream: service production reconfiguration** – or the extent to which service production entails the integration and coordination of actors across traditional functional units in the public sector, and also across other non-public sector providers. The aim of integration is to put the final users/beneficiaries (including service intermediaries) at the centre and treat their needs holistically. This can be simply sectoral (i.e. within one functional unit) or cross-sectoral (across functional units and across public and non-public sector actors).
- **Downstream: service offering reconfiguration** - or to the extent to which new services are added and new users reached (via different channels, especially digital) or existing services are simply rationalised and improved.

Table 3: Typology of social policy and service innovation

		(A) UPSTREAM: Social Policy Reconfiguration			
		Low		High	
(B) MIDSTREAM Service Production reconfiguration		Sectoral	Cross-sectoral	Sectoral	Cross-sectoral
(C) DOWNSTREAM Services offering reconfiguration	High	Sectoral Expansionary innovation	Cross-sectoral Expansionary innovation: i.e. Multipurpose horizontal one-stop-shops	Total sectoral innovation	Total systemic innovation
	Low	Sectoral Incremental innovation	Cross-sectoral Incremental innovation: vertical one-stop-shops	Sectoral development al innovation	Cross-sectoral development al innovation

Source: own elaboration

An effort to contextualise is then also required to better understand the key findings of the literature review and the revised proposal of methodological framework and operational components advanced as part of the i-FRAME 2.0.

We can anticipate that the evaluation and measurement identified and analysed by the scientific and grey literature provide only a few tangential insights into the various typologies of innovation. Obviously, this can be seen as a result of the time lag between an innovation being introduced and then analysed, measured, and evaluated. However, it can also be seen as a lack of capacity as shown by the complementary components of the IESI research, namely the consolidated mapping and analysis of ICT-enabled social innovation initiatives across the EU (see Misuraca et al., 2017a).

One of the key dimensions of innovation –and a main focus of the IESI research - is related to the attempt, through **service integration and one-stop shops**, to provide a single point of access and delivery of services, which integrates their production and administration. This approach has been emphasised in the above typology, even though the concept of social service integration and one stop shops have been around since the turn of the century (Aksim, et al., 2011; Champion and Bonoli, 2011; Ditch and Roberts, 2002; McQuaid, 2010; Minas, 2014; OECD, 2003; Wiggan, 2007).

Several potential benefits have been identified, such as: enhanced government efficiency through the reduction of transaction costs, more responsive services, information and knowledge sharing, etc. (Budapest Institute, 2014a; Minas, 2014). Yet, to date there is no evidence of impacts, and the evaluation studies on activation intervention 'normally ignore various ways of administrating activation programmes' (Minas, 2014, p. S51). It has also been stressed that there are several challenges to achieving these benefits (McQuaid, 2010) and that there is no one-size-fits-all solution to integrated service delivery (Munday, 2007).

We will come back to these challenges, as they contribute to the discussion on the limits of strictly positivist evidence-based policy prescriptions, and to the need to deal with complexity.

It is also worth recalling two hypotheses formulated in the previous phase of the IESI research. The first one is that countries in which there is a greater level of local autonomy and decentralisation of funding for the provision of social services are more likely to provide a fertile ground for ICT-enabled social innovation with a 'bottom-up' approach. The second hypothesis is that countries with a long history of ICT use in public administration, a public sector workforce familiar with ICTs, and a reasonable level of digital competence among their citizens, are likely to adopt ICT-enabled social innovation faster than others, moving from experimentation to deployment in different areas of social services provision' (Misuraca et al. 2015, p. 36). However, these hypotheses will require separate ad hoc research.

In view of the main findings of the scientific literature (which mostly concentrates on Active Labour Market Policies), it is worth underlining how more **recently integration and one-stop-shops have focused mostly on labour market policies and their integration with other social services**.

A review of the literature conducted for DG Employment, for instance, suggests that increased unemployment and changes in labour market risks are forcing European countries to change their approach. Instead of providing unemployment insurance for the temporarily unemployed male breadwinner and social assistance to those unable to work, they are adopting a more integrated and wider approach.

It has been observed that the two-tier system that discriminates between those with stable employment and those with more unstable and precarious employment is no longer fit for purpose (Minas, 2014). The former group can rely on insurance and first-tier activation programmes, whereas the latter has access to second tier benefits such as social assistance at the discretion of local institutions. However, members of the latter group often have multiple problems that entail contacts with several different public agencies.

Hence, **there is a move toward centring service integration around employment and the concept of activation**, defined by the OECD (2017) '*as a combination of policy tools that support and incentivise participation in the labour market and in society, to which other forms of social services and benefits are tied*'.

This trend has been conceptualised as **'triple integration'** in which three processes overlap (Clasen and Clegg, 2011): 1) Unemployment benefits are homogenised; 2) risk re-categorisation that weakens the boundaries between in-work and out-of-work benefits (i.e. job search obligations might be extended to others besides the unemployed, implying that boundaries between previously separate contribution arrangements are erased and broader categories of risk are formed); 3) Closer links between benefits and activation with increasing application of job search conditionality. So, on the one hand there is a more integrated provision of services but on the other, a wide application of the 'job first' principle.

One recent example at European level of this approach is presented in the **Council recommendations on long-term unemployed integration measures** (European Council, 2016). The recommendations have three objectives: (1) increase coverage with higher registration and active support for the long-term unemployed, (2) ensure continuity and coordination between relevant services, and (3) increase the effectiveness of interventions aimed at both the long-term unemployed and employers. The core instruments proposed are **Job Integration Agreements (JIAs)** that would link together providers, beneficiaries, and employers to produce a seamless, integrated, and personalised stream of services for the Long-Term Unemployed (LTUs). So, it seems that the Council envisions employment policies (through Job contracts) as the key to social services integration.

This digression will help us to explain the main findings of the review of the scientific literature. However, this does not mean that other PSSGI that cannot be tied to employment and job search conditionality are unimportant.

The supplementary systematic review of literature conducted in the last phase of the research aimed to strengthen the theoretical orientations which underpin the proposed approach and to provide further inputs into refining and improving the methodological framework and the operational components proposed to build the i-FRAME.

Integration of the **main findings of the review**, summarised here below, with a critical analysis of orthodox evidence-based policy approaches presented later, will justify and anticipate the changes in the revised meta-framework and its operational components.

The literature review identified three separate streams of evidence:

i) Experimental and quasi-experimental studies in the scientific literature;

ii) Macro-level indexes and indicators of broadly-defined social progress (i.e. beyond GDPs) indicators and approaches;

iii) Micro-level impact measurement tools for social innovation and social inclusion.

There is no overlap between these three streams. For example, the review found no scientific articles dealing with macro and micro-level measurement tools, neither did it find any insights from the scientific literature embedded in these tools, which tend to be purely practical. The scientific literature produces the most important inputs, outputs, and outcomes, but these are not used in the other two streams of evidence.

The search across the scientific literature focused on the following six broad PSSGIs : 1. Employment; 2. Social housing; 3. Child care; 4. Long-term care; 5. Social assistance; and 6. Social inclusion. The findings show that **in the scientific literature, most of the relevant contributions focus on employment policies, services, and interventions**. As anticipated above, this can be contextualised and makes sense with respect to the fact that in most countries the efforts are on employment, activation, and on linking the two with other forms of welfare.

On the whole, the literature on what works in term of employment interventions is inconclusive. However, there are indications that job search assistance is the most cost-effective intervention, whereas integrated Active Labout Market Policy approaches have different effects according to context and target.

In addition, public work programmes are seen as ineffective, and the evidence on enterprise zones and wage tax breaks is mixed. The evidence on targeted interventions (i.e. youth, women) is limited, but it seems to suggest that these are not very effective, especially those that target the youth. Unemployment Insurance has been shown to be effective in contrasting poverty. The psychological and behavioural implications of different approaches to intervention implementation have been shown to matter. Finally, one of the main shortcomings of this literature is that the studies tend to focus on the type of intervention and the outcomes produced, without considering the different organisational and governance forms under which the interventions are implemented.

At macro level, there is a plethora of 'Beyond GDP' types of indexes and indicators which aim to measure different dimensions of societal progress, but are difficult to link. It is worth noting that all of these indexes and indicators include environmental sustainability (costs of economic growth in terms of resource depletion and negative impact of pollution on health and overall welfare) as a key strategic dimension. On the other hand, the possible link between these indexes/indicators and the actual objects of social policy and social service innovation is very weak and distant. The social dimensions considered are very macro and building a logical path from micro interventions to these macro indicators would be very complex and long. Finally, we found no modelling simulation of the macro impact of social policies and services similar to the one we are proposing for employment policies (see **§5.3**).

Most micro-level impact measurements focus on a definition of social innovation that does not coincide with the focus of i-FRAME on social policy innovation. All these tools start from the perspectives of social enterprises, companies doing CSR, or NGOs. The indicators they use are no longer relevant measures of social policy innovation. Instead, these indicators will require further development by building on results from case studies.

An important outcome of the review concerns the distinction between **micro-meso-macro levels of analysis.** This distinction is made in very different and inconsistent ways in different contributions. Moreover, it depends on one's perspective, and could become a sort of a logically articulated Matrioska.

For instance, interventions in kindergartens and primary schools for child-care, schooling, and welfare in a given community can address: children; households; teachers; schools; and the community as a whole at system level. What is micro, meso, or macro in this context?

While the micro/macro distinction can be difficult, the meso dimension is particularly problematic. When you move from the community level to the administrative unit (province) the community belongs to, how does this distinction change? What happens when you go one tier up (region)? When you aggregate at the level of the national system, is this again meso with respect to economy and society as whole, or is this macro with respect to the child-care national system?

In typical economic terms one only has micro (individuals, firms, organisations, etc.) and macro (economy as a whole). However, in addition to traditional micro- and macro-economic effects, which focus on measurable ways of describing social behaviour, intermediate (meso) effects are considered in the literature on evolutionary economics.[25] This approach builds on the argument that the intermediate (meso) scale creates effects which need to be described using different measurements, mathematical formalisms and ideas. Thus, adapting the thinking of Dopfer (2006) and Dopfer et al., (2004; 2008), it appears that there are important structures which are not reflected in traditional micro and macro indicators (i.e. price signals and supply and demand curves, or the large economic measures of inflation, Gross Domestic Product, the unemployment rate, and other measures of aggregate demand and savings) that need to be considered.

Therefore, in our revised meta-framework, we keep the meso-level perspective to support the understanding of what we call 'Social Policy Innovation Ecosystems' (which are adapted from what has been conceptualised as ICT-enabled social innovation ecosystem in **§3.2**). The analysis of the meso level would, in fact, require the development of specific metrics and indicators for impact assessment that could be more or less formalised depending on the methodology that will be adopted and the specific context and policy domain under investigation.

Finally, as mentioned above, the supplementary review of the literature sheds more light on one-stop-shops for employment and social welfare services and highlights the variety and complexity of these services. It also shows that, to date, there is no robust evaluation on these forms of institutional innovation. Standard experimental and quasi-experimental studies seem to have been unable to capture, within the limits of their methodological requirements, this complexity. In this regard, the contextualisation of the findings from literature review brings to the fore the **need to establish the epistemological and methodological underpinning of the improved meta-framework** and the proposed evolution of i-FRAME. We will discuss this specifically in **§5.2**, both in terms of the methodological approach and of the operational components proposed for implementing it.

To this end, we need to digress briefly, in order to debate **the limits of Randomised Controlled Trials (RCTs) beyond Evidence-Based-Policy (EBP) positivist prescriptions**.

Evidence-Based Policy (EBP) is an approach that emerged in the 1990s and was especially pushed in the UK by the Labour Party under Tony Blair (Cabinet Office, 1999). It applied to all sorts of different policy fields the same principles that in the 1980s inspired the Evidence-Based Medicine (EBM) movement[26].

Obviously, there is nothing new in policymakers using evidence from research. What distinguished EBP from previous use of evidence, however, was that it tried to eliminate any ideological elements and judgments from the formulation of policies, and to limit arbitrary decisions of professionals (i.e. teachers, field workers, policy officers, etc.) due to rising scepticism about their expertise. It sought a rational decision-making process which kept politics and deliberation out of policy-making and rested on a positivist epistemology.

25 See Dopfer, Kurt, (2006), Dopfer, Kurt; Foster, John and Potts, Jason (2004 and 2008) and for a more recent analysis focusing on evaluation of ICT-enabled services, see: Misuraca G., Codagnone, C., and Rossel, P., (2013).

26 As defined by one of the key proponents EBM is: '*the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical experience with the best available clinical evidence from systematic research'* (Sackett et al., 1996)

A number of initiatives, think tanks, and policy research centres, established what makes good evidence defining a hierarchy dominated by Randomised Controlled Trials (RCTs), meta-analysis of coherent sets of RCTs to deal with the limited statistical base of each trial alone, and systematic reviews. All other sources of evidence are either not considered or rated as less reliable. Examples of EBP orthodoxy are: Campbell Collaboration[27]; Cochrane Collaboration[28]; Coalition for Evidence-Based Policy[29]; Grading of Recommendations Assessment, Development and Evaluation (GRADE)[30]; Scottish Intercollegiate Guidelines Network (SIGN)[31]; What Works Clearing House[32]; California Evidence-Based Clearing house for Child Welfare[33].

EBP has been criticised from various perspectives, including some that look at the policy processes and at the possible agenda conflicts between policymakers and scientists (McMillin, 2012; Sanderson, 2011; Strassheim & Kettunen, 2014; Torriti, 2010). However, we will focus below on three more 'technical' criticisms, following the analysis presented in brief by Munro (2014) and at length by Cartwright & Hardie (2012):

- Randomised Controlled Trials do not provide sufficient evidence to indicate that a policy, which is successful 'there', will work 'here';
- EBP orthodoxy implies an inadequate view of causality; and
- EPB approaches have limited objectivity due to social constructions and values affecting conceptualisation and measurement.

By discussing these criticisms and limitations of orthodox EBP, we continue to lay the foundations of the epistemology of complexity already presented in the initial phases of the i-FRAME research (see **Chapters 3 and 4**). This will allow us to identify the rationale for the revised meta-framework and for some of its operational components.

Even when they are implemented according to the best standards (e.g. random assignment, masking and double blindness, etc.), the external validity of RCTs is limited, as is the extent to which lessons from one of them can be generalised to other settings. This is particularly true in the social sciences, given the complexity that characterises socio-economic ecosystems.

A more concrete way of illustrating this is presented in Cartwright and Hardie (2012) and taken from an evaluation of an experiment carried out in California to improve students' reading scores (Bohrnstedt and Stecher, 2002). In the 1990s, the Californian authorities wanted to improve students' reading scores by replicating a successful experiment carried out in Tennessee in 1985 based simply on reducing the number of students per class. However, the Californian experiment yielded no positive results. Why?

Cartwright and Hardie (2012) explain that this failure was due to the lack of what they call 'support factors'. The settings in California were different from those of the original experiment; in particular, there was not enough space, nor were there enough good teachers for an increased number of smaller classes in the Californian school system.

This explanation requires a brief digression into **the notion of causality and the distinction between a causal description and a causal explanation**. To move from 'it worked there' to 'it will work here', we need to know facts about causal principles and contextual factors (support factors) both there and here. The recommendation one usually finds that the settings should be sufficiently similar is too vague. In some sciences, there are universal causal principles (i.e. the law of gravitation). This is not the case, however, in the social sciences where causal principles work *ceteris paribus*, and may shift, or turn out to be very local.

27 https://www.campbellcollaboration.org
28 http://www.cochrane.org
29 http://coalition4evidence.org
30 http://www.gradeworkinggroup.org
31 http://www.sign.ac.uk
32 https://ies.ed.gov/ncee/WWC
33 http://www.cebc4cw.org

The attractiveness of RCTs is that they are self-validating if implemented correctly (i.e. they ensure internal validity) and they do not require that we understand why a certain cause produces a certain effect. The How and Why can apparently be ignored. Policymakers 'can take a free ride and have confidence that this caused that, without wondering how it happened, because somebody knows' (Cartwright and Hardie, 2012, p. 124).

In practice, however, all the times what worked there turns out not to work here shows that things are more complex and we cannot get away from theory, and eventually deliberation. **Methodologically, one should make a clear distinction between a causal description and a causal explanation**. In the former, we make a general statement relating two items. The classic example is the relationship between flicking a light switch and turning on the light. Instead, we make a causal explanation when we can account for the fact that the relationship between the light switch and the light may fail if the bulb burns out (Bogliacino et al., 2015). A single RCT will provide only a causal description. If we want to design a policy that will work here, however, we need to provide a causal explanation. Clearly we need a good theory for this (non-overlapping categories with high explanatory power) and good operationalisation of measurement. It is also clear that an experiment cannot free the social scientist (or the policymakers informed by it) from dealing with theory.

Each single cause, including a policy intervention, is an INUS condition for its effect, meaning: *'an Insufficient but Necessary part of an Unnecessary but Sufficient condition for producing a contribution to the effect'*. Put it another way, we need to search for consequences of non-redundant pieces of non-necessary but sufficient contextual causes (Bogliacino et al., 2015). In simpler terms, **a policy intervention can rarely cause an effect by itself but does so in combination with other contextual support factors**. Moreover, there are many other alternative combinations of factors that can produce the same effect.

This means that an intervention may have iatrogenic (unintended) impact on other causal combinations that may have caused the sought-after effect anyway. The generalization of a tested policy is conditional on the equivalence between the policy to be implemented and the already tested one and on assumptions over how agents in different context respond to the tested intervention. As a result we always have problems when we extrapolate units, descriptively different treatments, and observations to alternative settings (Cronbach, 1982). Rigid counterfactual protocols are instrumental to this process, but are not a magic bullet. Experiments provide highly localised evidence, while the intervention itself and the behavioural assumptions aim to be very general. Moreover, experiments deal with means, not ends. They provide insights into how to accomplish a target but cannot determine which aim to prefer.

Policy remains a domain of competing interests where deliberation cannot be ruled out. Hence, before simply replicating an intervention here because an RCT showed that it worked there, policymakers and their advisers must always ask how and why questions, rather than following the deterministic prescriptions of orthodox EBP. Cartwright & Hardie (2012) recommend that a horizontal search of support factors and a vertical search of causal principles at the correct level of abstraction should always be carried out.

As explained by Munro (2014), orthodox EBP recipes: *'take too simplistic a view of causal processes in the social world, assuming a degree of regularity that allows for generalizing from observed causal connections. The complexity of the social world is presented as an obstacle to this assumption. Instead of conceiving of causality as simple and linear, independent of context with controllable outcomes, it is argued that the social world is an open system in which causal processes are non-linear' (Munro, 2014, p. 63)*.

As Pawson (2006, p. 18) put it, social sciences try to uncover what looks like a regular pattern to often discover that institutional and historical forces, which differ in different settings, shape these patterns and make them very local. For example, Munro evaluated a UK intervention for child protection (2011) which aimed to improve the welfare of children and young people by introducing stricter rules on social workers. But the intervention failed because it had several unintended negative effects. Introducing rules which limit what social workers can do reduces their sense of satisfaction and self-esteem. The first negative effect is an increase in staff sickness and absence rates. The second is an increase in staff turnover rates. In turn, these can increase the average social worker's caseload, which then leads to social workers spending less time with the children and young people and their families. So the policy may produce bad

unintended consequences. Worse, these negative effects can become amplified via the feedback loops. This is a clear example of a policy that was designed without considering the complex and non-linear causality that characterise social ecosystems.

EBP's claim to objectivity raises a number of questions about the fact that **concepts and measurement in the social sciences can be socially constructed and value-laden** (Cartwright and Hardie, 2012; Cartwright and Runhardt, 2014; Munro, 2014). Some of these challenges are more politically motivated. Some critiques assert that the concepts and measurements used in empirical research and ranked as best evidence by EBP are in fact chosen and framed by particular groups, especially by those in power. This may bias the research and prevent us from considering the views of less powerful social groups.

As regards more technical challenges, it is a matter of fact that **concepts and measures in the social world must be socially constructed and entail subjective choices**. This may limit the generalisation of findings at best, and can produce systematic measurement errors at worst. In the social sciences, we do not use or measure concepts like those of the natural sciences. Often social science concepts are unobservable, such as trust and satisfaction, or are fuzzy umbrella concepts which encompass multiple dimensions. These concepts may be difficult to operationalise and lead us to use proxies that sometimes are the source of measurement errors.

Most importantly, as stated by Max Weber in his famous methodological essay (1904), *'social scientists must study concepts that they and the society in which they work care about, and that may be valued or disvalued*'. But it is not always easy to use and measure concepts that validly reflect the underlying phenomenon and that enable explanation, prediction, and control. So, when moving to operationalisation, we may be forced to accept proxy measures that often do not really reflect the underlying phenomenon. This frequently results in *'fractional measurement*' (Etzioni and Lehman, 1967), which means the lack of correspondence between the explanation of a concept/phenomenon and the operational definition shaping its measurement. Researchers may therefore be tempted to solve this problem by defining the concept only in terms of what is operationally measured, which Etzioni and Lehman call '*concept reduction*'. This practice amounts to a sort of reification of measurements that causes systematic measurement errors, prevents robust evaluation, and sends the wrong messages to policymakers. For all these reasons, and especially because social sciences should study what we care about (as posited by Weber), we cannot but agree with Cartwright's statement that: '*social science measurement is value-laden through and through*. *In general, we can say that the aims we have with social science measurement decisively influence the results we will find*' (2014, p. 284).

5.2 Improved meta-framework and operational components

5.2.1 The revised meta-framework

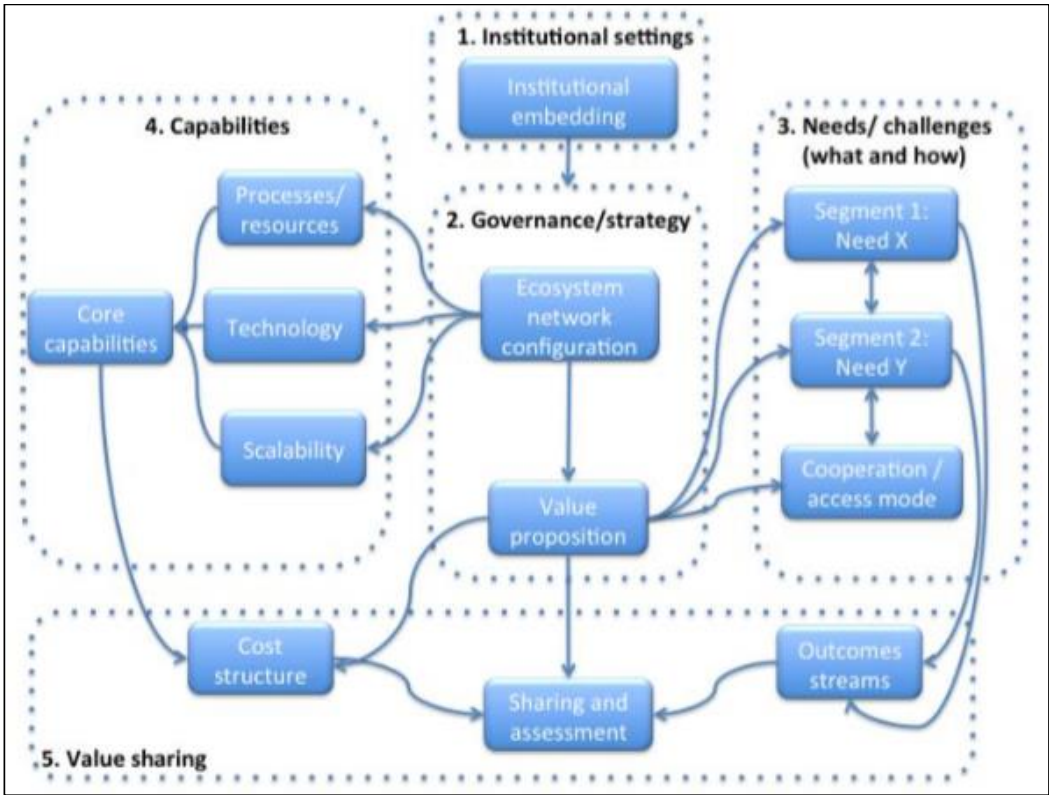
As previously mentioned, the main objective of this report and of this concluding part of the research was to refine and revise the previous versions of the i-FRAME meta-framework (Misuraca et al., 2015). In the methodology section, we introduced an important change with respect to the overall scope of the focus of the i-FRAME. We have moved from a focus on strictly defined ICT-enabled social innovation to social policy innovation promoting social investment.

This change underpins the revision of the meta-framework ,though the i-FRAME 2.0 continues to build on the key pillars of the original version – for example, the view of the '(digital) social policy innovation **ecosystem'** (see **Figure 5** in **§3.2**). Although the initial focus was on ICT-enabled social innovation, the conceptualisation made in the previous versions of the i-FRAME is still fully relevant for the broader definition of social policy innovation adopted in this report.

This definition still considers ICTs to be necessary horizontal conditions, especially in the light of current and emerging trends towards the digital transformation of our societies and digitalisation of the labour markets. Digitalisation has consequences and implications for the future of work and welfare systems, as pointed out the EU Pillar of Social Rights, and on the White Paper on the Future of Europe on occasion of the 60th anniversary of the Rome Treaties.

The contextual ecosystem within which social policy innovation needs to be considered should be fleshed out in both the design and the evaluation phase of any policy, service, programme, or initiative.[34] At the same time, the **complexity** of introducing innovations in practice remains a crucial pillar of the i-FRAME rationale and implementation. In this perspective recalling what has been discussed at length in the i-FRAME 1.0 and 1.5, **Figure 16** provides a stylised representation of the elements of complexity in social policy innovation.

Figure 16: Integrated social policy and service innovation in practice



Source: Misuraca et al., 2015, p. 66

For instance, this stylised representation could be applied to disentangle the main sources of complexity and challenges that must be considered when launching joined-up initiatives such as one-stop shops (see **§5.1**); these aim to provide several PSGGIs with one point of contact and require governance and management of partnerships and coordination (see more in Misuraca et al., 2015, pp. 66-67).

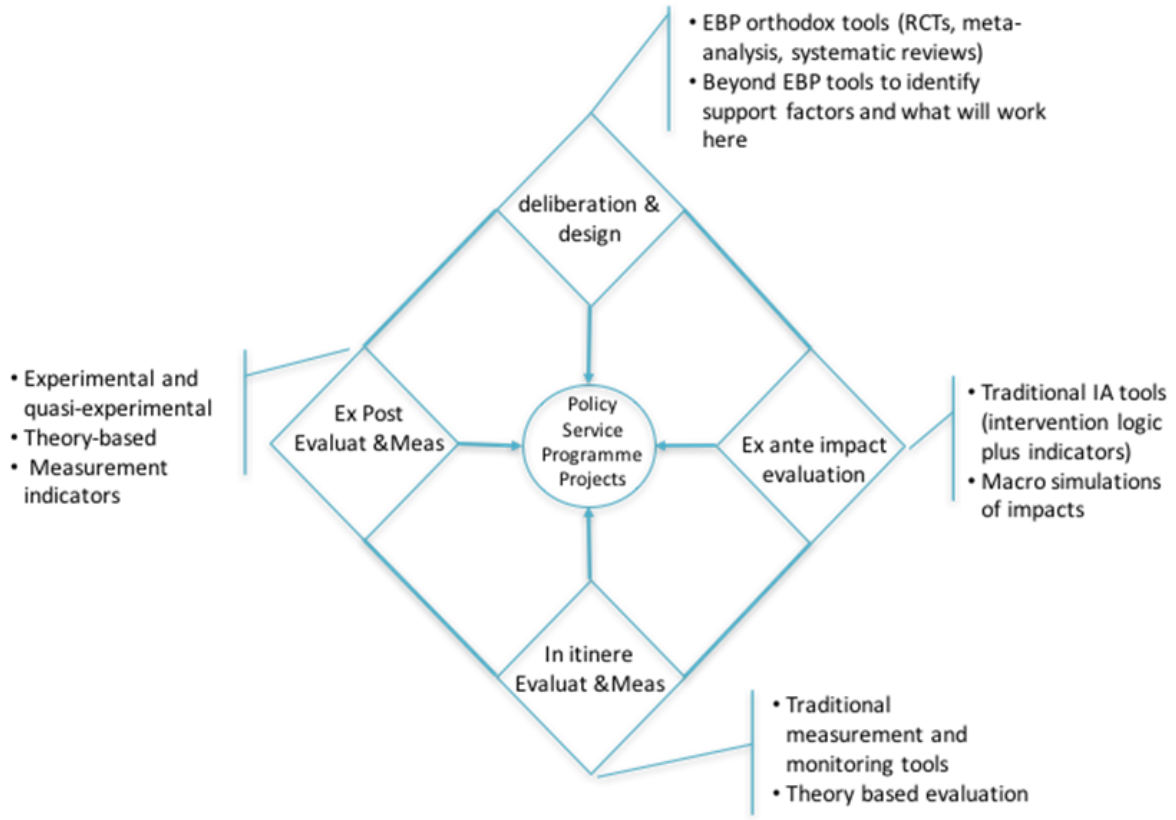
The initial proposal for the meta-framework advanced in i-FRAME 1.0 was clearly a preliminary portrait of the various levels/dimensions and related methods and approaches that could be used to better understand and assess impacts of ICT-Enabled Social Innovations. The i-FRAME 1.5 was operationalised in a dynamic manner with respect to some of the operational components (namely the dynamic simulation modelling).

Figure 17 presents the refined version of the i-FRAME 2.0 as a generic meta-framework which can be applied at different levels. Here, the crucial deliberation and design step has been added. In the previous i-FRAME 1.0 version it was hidden, while in i-FRAME 1.5 it was incorporated only at a technical level, under the Group-Modelling Building phase (see **§4.2** and **§4.3**).

In this improved approach, we move forward from the idea of a methodological meta-framework towards turning the i-FRAME into a dynamic **'Knowledge Base on Social Policy Innovation'** (see **§5.3** and Chapter 6).

34 For the discussion on the ICT-enabled social innovation ecosystem the reader is referred to the relevant report of the previous phases of i-FRAME development (Misuraca et al, 2015, pp. 42-46) as well as in brief to §3.2 of this report.

Figure 17: i-FRAME 2.0: Diagram for Evidence-Informed Social Policy Innovation



Source: own elaboration

The revised proposal will become clearer when we give examples of the operational components in **§5.3.2**. As groundwork for this discussion, we briefly illustrate the general principles and rationale for the improved proposal for the development of i-FRAME 2.0.

First of all, following our critique of an orthodox EBP prescriptive positivistic approach, if we can never be sure that what worked there necessarily will work here, but we still want a policy measure to be successful, then we need policymakers to choose between competing proposals for funding allocation on the basis of a sound assessment of the support factors and causal principles which provide the best possible guarantee that a given policy will work here.

Obviously, this should not rely on politicians' own discretion and judgment, but should take into account the suggestions from the more traditional and orthodox EBP approaches and also the alternatives. For this reason it is important to add the 'deliberation and design phase'. This step will help shape the design of interventions and eventually inform the three phases of evaluation (*ex-ante*, *in-itinere*, and *ex-post*). It will produce gradual but constant improvements across the cycle depicted in what we have called the **Diamond for Evidence-Informed Social Policy Innovation**.

In our approach, we are not offering magic bullet prescriptions as alternatives to those of orthodox EBP, but rather a set of options. These are inspired by methodological pluralism and by the recognition that, in social policy, we are not under conditions of paradigmatic normality. Instead, we are closer to those of post-normal science. As explained by (Cartwright & Hardie, 2012, p. 93), it is not possible to provide unambiguous and prescriptive rules for social policy that predict the results of interventions. Some discretion will be needed, albeit informed by pluralist, open, and transparent evidence.

As we illustrated earlier (see **§5.1**), RCTs as such only provide causal descriptions and no automatic guarantees that what worked there will work here. In **Annex IV**, we further specify the issues of validity and the problem of generalisation from a single RCT, or from the meta-analysis of many of them.

In order to check, in the deliberation phase, whether a successful policy can work in different settings, we must look for causal explanations for the 'how' and 'why' questions, (i.e. causal principles and support factors).

This can be done in two ways. One is structural econometric evaluation (Heckman, 2008, 2010), which is not considered in this study or presented with the operational components. This is because it has limited results in the field under investigation as discussed above, though it is a consolidated technique.

The second is to use approaches based on a broadly defined **theory of change or theory-based evaluation**[35]. In theory-based policy evaluation interventions are not seen as monoliths. In addition, beneficiaries and stakeholders are not simply passive recipients and takers of the 'treatments': their views are crucial to the evaluation. These views are collected through interviews or from relevant documents (e.g. programme documents, multi-annual plans, research agendas, project documents) and are treated as 'theories' of change and action. They are used as hypotheses to be tested empirically. Second, unlike counterfactualism, context is not controlled for statistically. Instead, it is seen as the key to understanding the interplay between intervention and effects. Contextual variables are 'measured' from the perspective of involved players and through available external sources of evidence (i.e. statistics, review of relevant literature).

The tools for the proposed deliberation phase are inspired by this latter approach. Hypotheses and theories can be derived from RCTs, meta-analysis, systematic reviews, and other mixed methods of evaluation. They should then be tested in the settings where a policy is being considered, having gathered all the relevant evidence using mixed methods and triangulating different sources of evidence[36].

The theory has to describe what conditions are needed and what causal principles may be at work for a policy to achieve the desired outcomes. Assumptions may be developed during the different phases and steps of an intervention and then checked with available evidence. In the deliberation phase, this process may identify where conditions may be lacking or where the assumed causal principle may not work. This may lead to the planned policy being discarded or redesigned. The same logic can also be used *ex-post* to understand why a policy succeeded or failed.

In the *ex-ante* evaluation phase, traditional **Impact Assessment tools** are obviously used in most of the European Commission's evaluation approaches. Our key and innovative contribution, especially with respect to the available literature, are the two **macro-level modelling simulations** proposed (see **§5.3**).

Finally, an operational tool that can be used across *ex-ante, in itinere*, and *ex-post* evaluations is a **system of monitoring indicators of inputs, outputs, and outcomes**. Theory-based methods can also be used *in itinere* and *ex post*.

Clearly, for the *ex-post* phase there are **experimental and quasi-experimental methods**, which are well known. However, the latter methods are not among the operational components proposed because they are already recognised and methodological guidance on their use is widely available in literature.

The operational components we present next thus consider the deliberation and design tools, *ex-ante* evaluation methods, measurement indicators and the experimental application and extension of a simulation approach using Agent-Based-Modelling. This last component are being further developed and tested in the research that follows the research conducted to propose the i-FRAME 2.0 as part of the IESI project (see **§5.3**).

35 The application of approaches of theory-based evaluation has increased in the last twenty years as documented in a recent systematic review (Coryn et al., 2011) and are considered as 'coming of age' (Mayne, 2012). In simple terms all these different authors use a variety of ways of developing a causal modal linking programme inputs and activities to a chain of intended or observed outcomes, and then using this model to guide the evaluation.

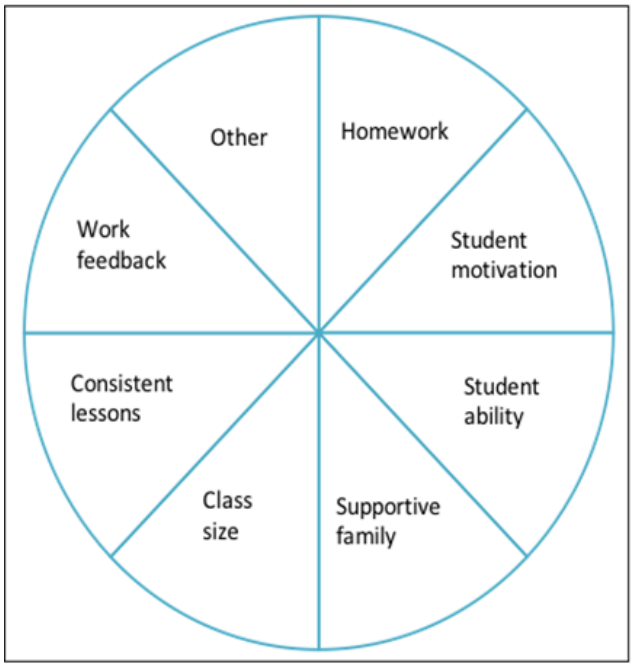
36 Qualitative research has been the object of a long and controversial debate for it is difficulty to establish its own equivalent to the three ''truths' of quantitative methods (validity, reliability, and generalisation). Several scholars hold that external confirmation of qualitative findings through well designed purposive sampling checking and methods/sources triangulation can enhance the credibility and validity of qualitative research (Bryman, 2006; Denzin & Lincoln, 2005; Miles & Huberman, 1994; Seale & Silverman, 1997).

5.2.2 Operational components of the i-FRAME 2.0

5.2.2.1 Deliberation and design: from it worked there to it will work here

Support factors. As illustrated in **§5.1**, the reduction of class size in California failed to raise reading scores as had happened in a RCT conducted years earlier in Tennessee. **Figure 18** presents an evidence-informed view of the combination of support factors needed and explains why the policy failed in California.

Figure 18: Support Factors - Reading Score Example



Source: Adapted from Cooper et al., 2006

The reduction of class size was just an INUS condition (an Insufficient but Necessary part of an Unnecessary but Sufficient condition for producing a contribution to the effect), and other conditions were lacking. On the other hand, the above combination of conditions is sufficient but unnecessary, in the sense that there are other possible configurations of conditions that can cause the effect sought (improved reading scores).

Identifying the support factors and the corresponding causal principles at work in one setting is not an easy task and there are no clear-cut recipes, but the following tools can help the process of policy design and evaluation:

(1) Problem tree;

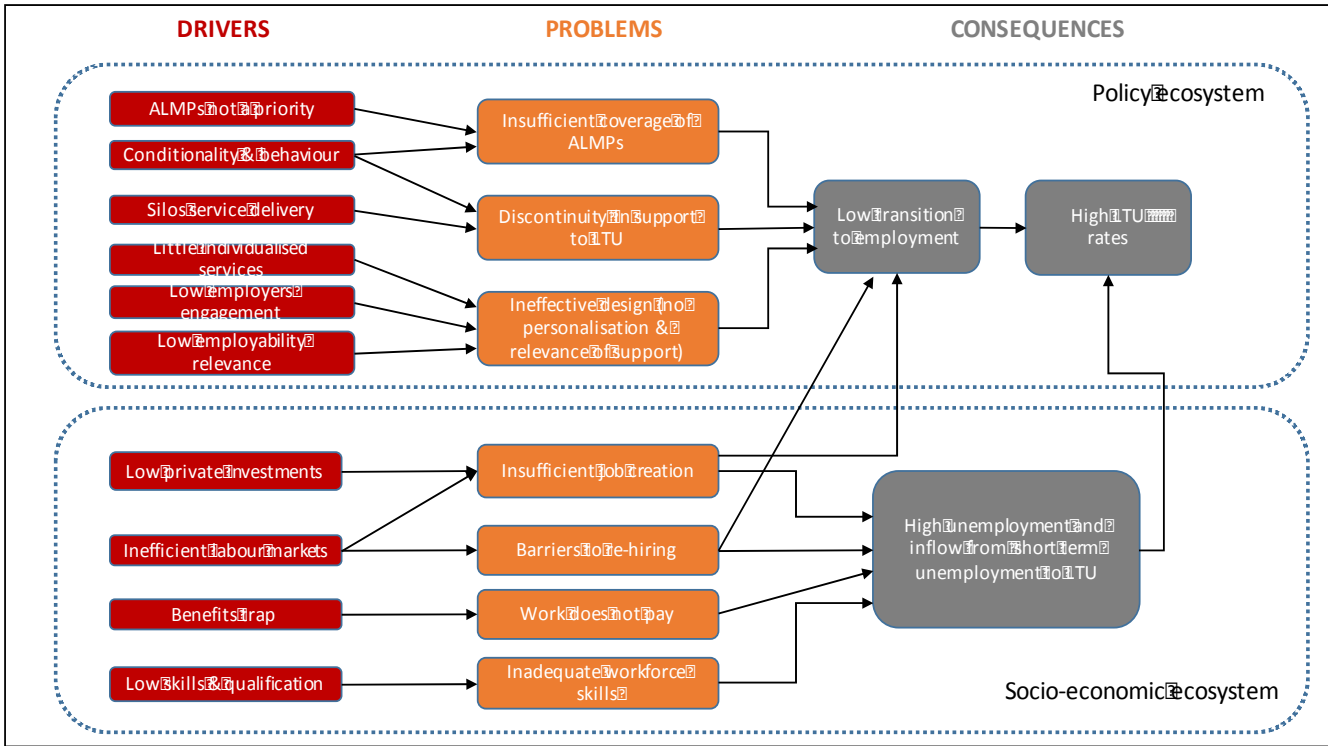
(2) *Ex ante* failure scenario with simplified causal model;

(3) Step-by-step and backward theory-based evaluation thinking;

(4) Quick exit tree.

i. Problem tree. As explained in **§5.1**, the European Council (European Council, 2016) released recommendations on how to better integrate support to the Long-Term Unemployed (LTUs). One of the key instruments proposed included Job Integration Agreements (JIAs) that would link together providers, beneficiaries, and employers to produce a seamless, integrated, and personalised stream of services for LTUs. **Figure 19** shows the problem tree developed to justify this recommendation.

Figure 19: LTU problem tree



Source: Open Evidence and EY for JRC, 2017

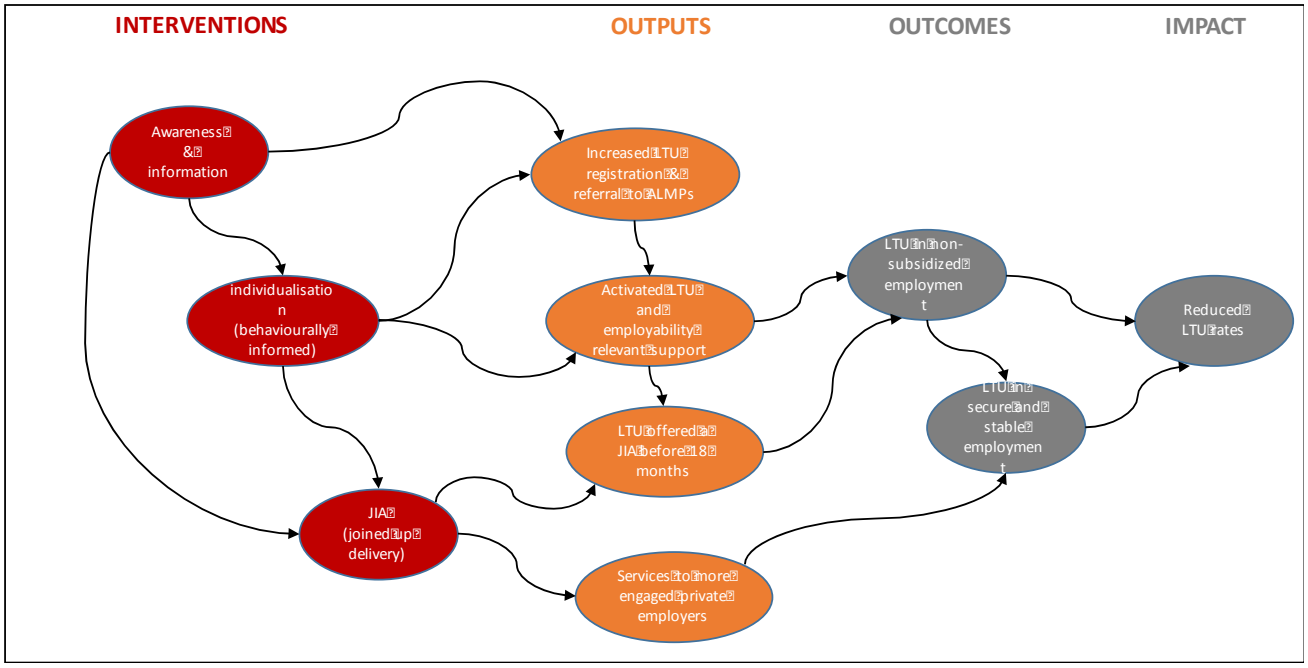
From the above problem tree, using the reviewed literature, as shown in **Figure 20**, can then be developed the configuration of the support factors needed for JIAs to produce the desired outcomes. Decision makers should take these factors into account when introducing JIAs in their settings.

Figure 20: LTU intervention support factors

Source: Open Evidence and EY for JRC, 2017

ii. *Ex-ante* failure scenario. An alternative instrument is to develop a simplified Causal Model of the intervention (here, we are still considering the JIAs proposed for integrating services for LTUs) see **Figure 21**. This is a collaborative approach which involves a group of policymakers, stakeholders, and experts in a collective construction of an *ex-ante* failure scenario. They imagine the policy fails and then draw up a list of factors that are necessary for the policy to work. They must envision that the policy has been put in in place as planned but things go wrong: i.e. the question to ask is *'What could go wrong and why?'*

Figure 21: LTU intervention simplified causal depiction



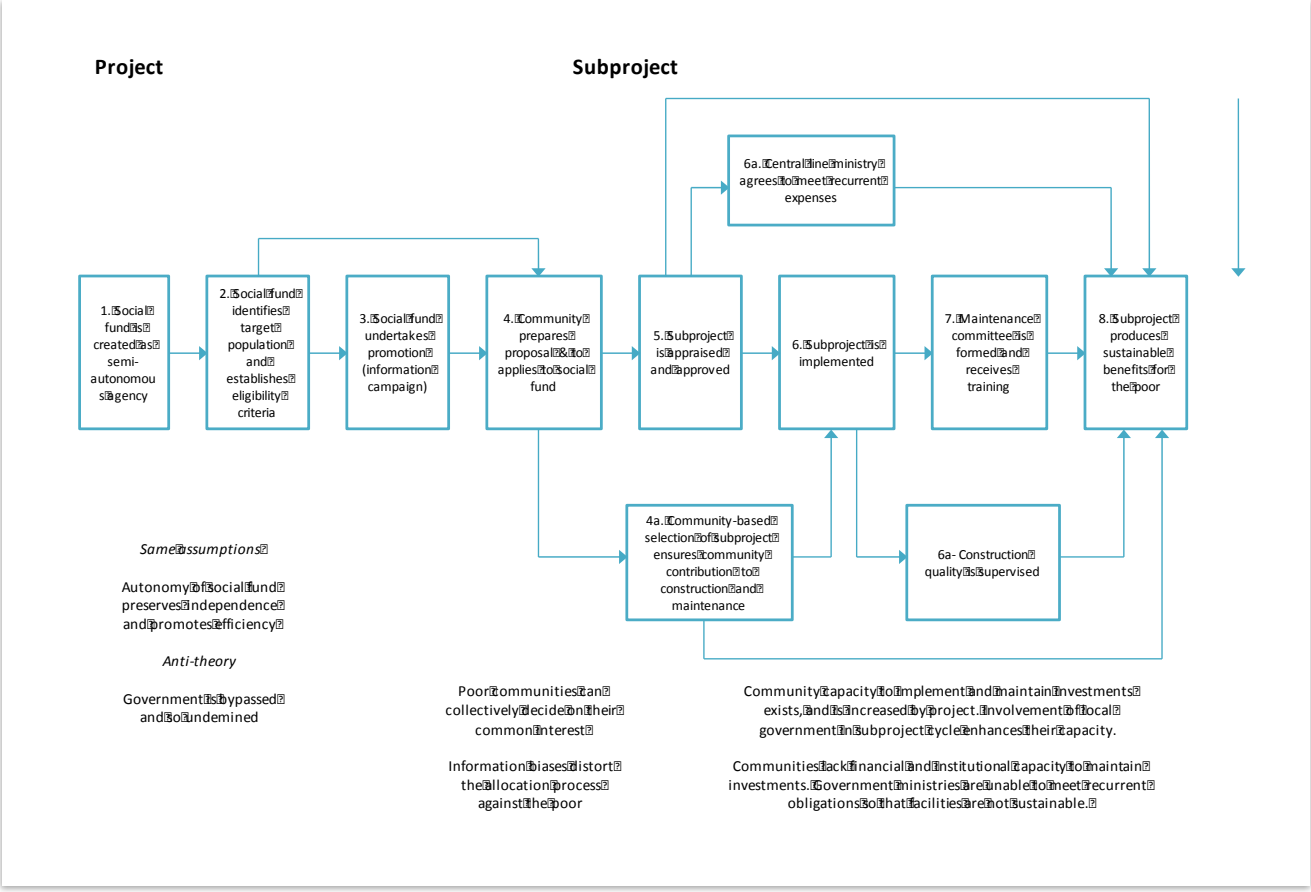
Source: Open Evidence & EY for JRC, 2017

This approach is similar to the more technical approach of Group Modelling Building discussed in **Chapter 4**, which is a crucial element of the methodology proposed in i-FRAME 1.5. It is also becoming rather common in Policy Labs and/or Systems Design / Design Thinking methods, which are also connected to the methodology proposed for i-FRAME.

The structured approach followed in these techniques in fact facilitates the formalisation of rules and relationships, and it also allows us to identify drivers and barriers, and indicators and variables. These can be used as inputs to develop simulation modelling approaches, based for instance on 'Small-world' system dynamics or more elaborated simulation modelling methods supported by computer-based simulation tools and based on formal structured scenarios of use.

iii. Step-by-step and backward theory-based evaluation thinking. This approach, also called process tracing aims to confirm the existence of a causal connection between the start and the end of a process or policy by checking, one by one, a series of smaller causal steps in between against the available evidence. One good example, reported once again in Cartwright and Hardie (2012, p. 102-107), is the application of this approach to the World Bank social funds by Carvalho and White (2004), see **Figure 22**.

Figure 22: Example of 'process tracing' approach on World Bank Social funds



Source: Carvalho & White, 2004, p. 14S

By thinking through step by step how social funds may lead to the desired outcome one can derive the support factors depicted in **Figure 23**.

Figure 23: Support Factors for Social Funds

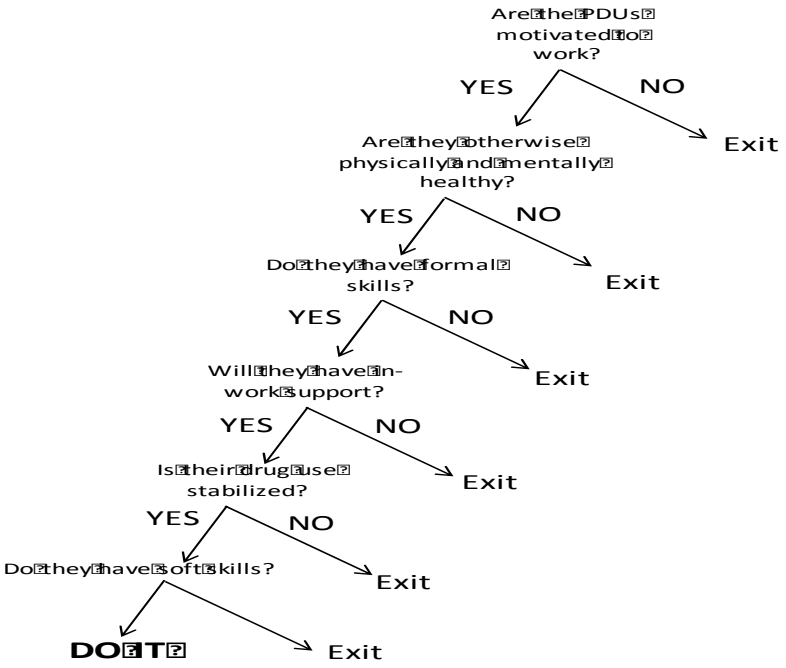
Source: Cartwright & Hardie, 2012, p. 103

iv. Quick Exit Trees. This method is based upon simple tools which aim to eliminate/select policy options by answering binary Yes/No questions with evidence. The approach provides clear cut answers and may save efforts if the NO comes up at the very beginning of the policy design phase. As shown in **Figure 24**, the approach can be based on a simple 'pen and paper' exercise. It could also be supported by computational techniques, which would formalise the results and archive previous experiences in a structured manner in order to build evidence over time. As we will see in **§5.2.3**, this is one of the aims of the i-FRAME Web Platform proposed to be developed.

This method entails a series of questions on the presence or absence of a condition needed for a policy to work. If the first answer is YES, then one proceeds to the next question, but if the answer is NO then one can stop and discard the policy. The advantage is that it provides an unequivocal answer as to whether a policy will work 'here'. This, however, requires that all the possible conditions are laid down in the tree and that evidence is gathered to answer all the questions.

On the other hand, as it requires a dichotomous answer it does not allow for more nuanced answers or scores. The evidence available must be very robust to back the YES or NO answer. Moreover, it must be remembered that the conditions set out in the exit trees are only one possible configuration of support factors. If a NO answer occurs, before abandoning the policy a different tree with other possible support factors should be tried.

Figure 24: Quick Exit Tree for Work Ready Policy for Problem Drug Users (PDU)



Source: Cartwright & Hardie, 2012, p. 115

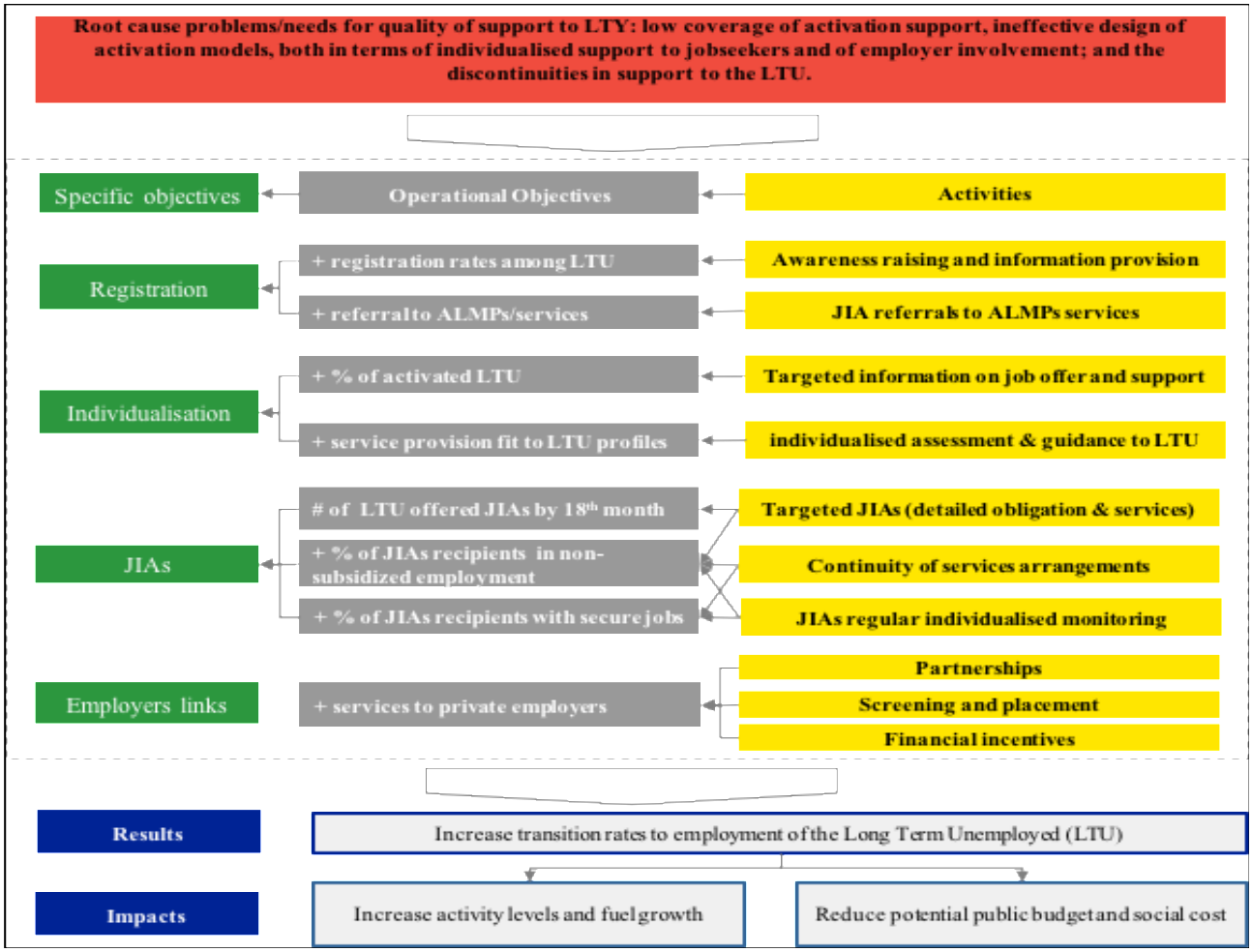
Figure 24 shows an exit tree which was developed by the United Kingdom Drug Policy Commission (UKDPC) to evaluate a policy to help Problem Drug Users (PDUs) get back to work (UKDPC, 2008). This is a typical policy to take people off welfare and into work and was called *Work Ready*). Many conditions were considered and analysed, although the unrealistic character of this policy could have been spotted and effort saved if one question had been asked at the very beginning. Would employers be willing to hire PDUs? A later piece of research showed that this was very unlikely, so the policy was put on hold and the UKPDC recommended that further evidence be gathered before introducing this policy.

The same kind of exit tree can be developed for the JIAs intervention recommended by the Council and described in the example of LTU policy above (would employers buy-in?) and for most 'work first' policies which link benefits to conditionality and to employers joining in the policy.

5.2.2.2 Ex-ante evaluation

Figure 25 represents a typical instrument in the European Commission's *ex ante* impact assessment toolkit, i.e. **Intervention Logic Model** (again, we use the example based on the Council's recommendation for JIAs to combat Long-Term Unemployment – LTU).

Figure 25: LTU Intervention Logic Model



Source: Open Evidence & EY for JRC, 2017

Although this tool entails a deterministic approach to the unfolding of an intervention and to the way it causes the desired effects, it is nonetheless a very useful and practical support to policy design and evaluation. However, if this tool is not backed by the deliberation tools described earlier (as is often unfortunately the case, especially in social policy innovation), it only serves as a conceptual framework to define monitoring indicators.

In our approach, we therefore propose two types of innovation:

- the development of a **computer-based measurement system** with a pre-defined system of indicators for monitoring and evaluation, which is flexible enough for customization to specific interventions and different contexts, and also
- a **simple toolkit and guidelines** for *ex-ante* and *in-itinere* impact assessment, to support, the structuring and formalisation of policy/programme/project design and evaluation. Based on a structured repository of experiences a knowledge base with evidence of results can be built and support better informed decisions. The evidence-base gathered could be used to define variable and scenarios of use for modelling and simulation of impacts.

This approach, as we will see in **§5.4.3** could be incorporated into the proposed i-FRAME Web Platform. The **MIREIA electronic toolkit**, previously developed by JRC in the area of employability and social inclusion, could be adapted and extended for this scope.[37]

Another innovation refers to the two experiments with macro-level simulations of the impacts of Active Labour Market Policies and of Mission-Oriented Social Innovation Policy, which are based on an extended version of the **K+S model**. This will be briefly explained in **§5.4** and in **Annex II**.

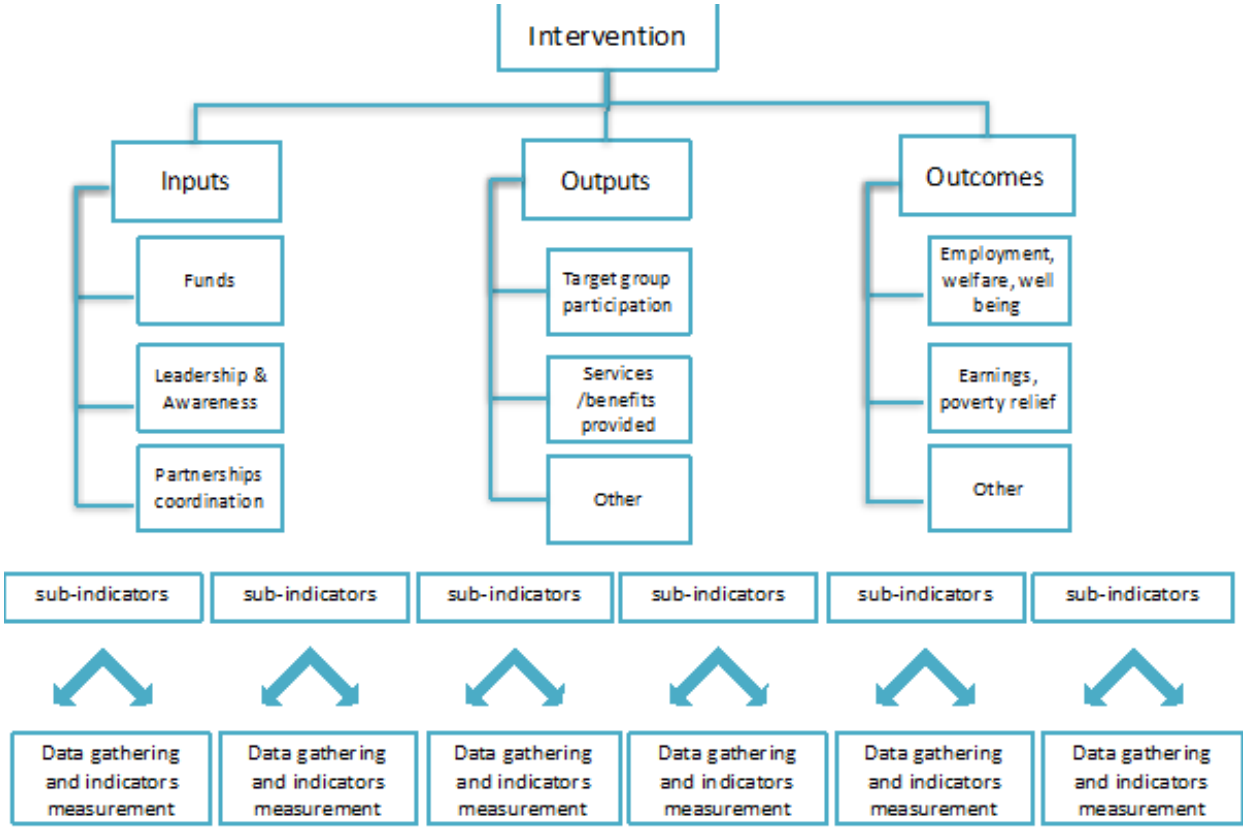
5.2.2.3 Measurement indicators

As mentioned above, the intervention logic which underpins traditional policy evaluation methodologies includes the definition and quantification of indicators for monitoring. These indicators make it possible to measure results during the implementation of a policy, and they also form the basis of evaluation of outputs/outcomes and impacts.

Measurement methodologies are based on accepted approaches and standards. As we have already discussed them extensively in the report on the initial version of i-FRAME 1.0, [38] and also in other recent studies (see, for instance, the already mentioned JRC MIREIA Impact Assessment Framework, Misuraca et al., 2014), we do not enter into details here.

Moreover, as mentioned several times, the specificities and complexity of social policy innovation limit the availability of evidence that could be used to operationalise and differentiate measurement indicators for the various areas under investigation. In **Figure 26**, we therefore only present a generic example of a system of measurement indicators which could be adapted to the various areas of analysis and structured as a formal electronic toolkit, see **§5.4.3**.

Figure 26: Generic micro-level measurement tool



Source: own elaboration

37 See http://is.jrc.ec.europa.eu/pages/EAP/eInclusion/MIREIAeI2.html

38 A set of indicators has been presented in version 1.0 of the i-FRAME (see Misuraca et al., 2015, pp. 59-60 Table 5 and Table 6) These can be further developed in the i-FRAME system of indicators building on case study analysis.

In **Table 4**, we present a set of indicators to monitor the JIAs recommended by the EU Council. The operationalised and differentiated version of these measurement tools could be produced as part of the i-FRAME 2.0 platform. This platform will also benefit from in-depth case studies analysis, consultation, and validation and will be carried out during the course of 2017.

Table 4: LTU intervention monitoring indicators (exemplificative only)

Objective	Indicator	Definition	Unit of measurement	Sources of data
Increase registration rate among LTU	Share of LTUs who are registered	Share of LTUs who self-report in LFS that they are registered	% change over baseline	Labour Force Survey (LFS)
Increase Referral to ALMP services	Number of referrals to ALMPs/ services included in JIAs	Average number of referrals to ALMPs., employment / social services in JIAs	Averages absolute values	Reporting by implementing organisations
Increase share of activated LTU	Activation rates of LTU	Number of LTUs participating in employment services and ALMPs/ total number of LTU	% change over baseline	Employment Committee (EMCO) Joint Indicators Framework
More personalised service provision	Share of LTUs reassessed before completing 18 months of unemployment	Number of LTUs reassessed/ Total number of unemployed for 12- 18 months	% change over baseline	Labour Market Policy (LMP) database
Increase share of registered LTU who have been offered a JIA in last 18 months	Share of LTUs with JIAs	Number of registered LTUs who sign JIAs/ total number of registered LTUs	% change over baseline	Reporting by implementing organisations
Increase share of JIA recipients who make the transition to non-subsidized employment	Successful transitions to non- subsidized employment	Number of JIA recipients in non-subsidized employment/ total number of JIA recipients (6 and 12 months after concluding JIAs)	% change over baseline	Possibly from PES benchlearning
Increase share of JIA recipients who make the transition to permanent full-time contracts	Successful transitions to permanent/ full- time contracts following JIAs	Number of JIA recipients in permanent (and/or) full-time employment / total number of JIA recipients who make the transition to employment (6 and 12 months of concluding JIAs)	% change over baseline	Possibly from PES benchlearning
Increase services to private employers	Share of ALMPs targeting private employers	Ratio of expenditure on ALMPs / ratio expenditure on public works ALMP measure	% change over baseline	Labour Market Policy (LMP) database
	Share of JIAs accompanied by employer support	JIAs linked to an employer service/ total JIAs	% change over baseline	Reporting by implementing organisations

Source: Adapted from European Commission (2015b, p. 47)

5.2.3 Prototyping a computer-based simulation model for i-FRAME

The JRC is developing a structured web-based environment to support the IESI research activities for data gathering, management and analysis. This web-based environment could also be extended to integrate a computer-based simulation model for social impact assessment. It would be based on the **i-FRAME Web Platform**, which could integrate a number of different software application 'suites' for micro-data gathering and measurement of initiatives. These will be collected through the IESI relational database and web-tool developed by JRC to support mapping activities and *ad hoc* in-depth case studies. The web-based environment could also include a more sophisticated platform to support the implementation of the operational components proposed as part of the i-FRAME methodological approach.

As outlined during the *Final IESI Conference held in Brussels on 14-15 March 2017*, the back end and front end of i-FRAME Web Platform could be structured according to the preliminary ideas shown in **Figures 27** and **28** below. **Figure 27** shows the IT environment already developed and functioning at the JRC. This includes the web-based relational database with interactive dynamic workflow and dashboard for data management; the IESI online data gathering portal with flexible modular approach and the Online Community and Research Collaboration portal, also connected to the JRC Science Hub and related applications (accessible both internally and externally to the European Commission, and secured according to EC rules).

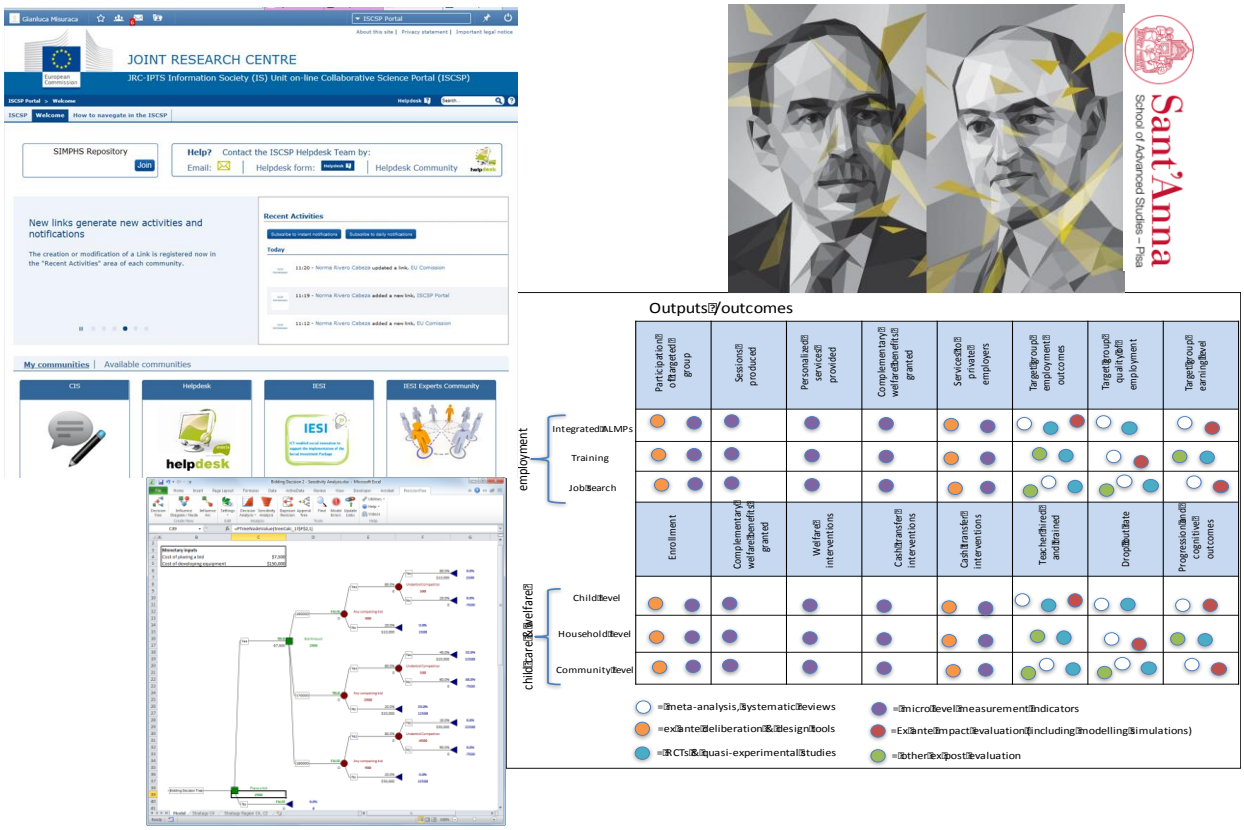
Figure 27: IESI Online Knowledge Base and Portal

Source: Presentation by G. Misuraca, at the Final IESI Conference, Brussels, 14-15 March 2017

Figure 28 provides a preliminary snapshot of the prototype of the operational components of the final version of the i-FRAME currently under development. This prototype of computer-based simulation model would encompass all the possible levels of analysis by using the same structural environment, and allow us to collect data at relevant levels of analysis through the definition of measurable and coherent indicators.

To this end, as anticipated in **§5.2.2**, a number of relevant tools could be adapted and/or extended in order to integrate them into the prototype i-FRAME 2.0 platform, as part of an **Interactive and dynamic warehouse for Evidence-Informed Social Policy Innovation (EISPI)** (see **§5.3**). These tools could include a computer-based problem tree, and an adapted version of the JRC MIREIA electronic toolkit for impact measurement, to also support other methodologies and techniques, such as *ex-ante* failure scenarios with a simplified causal model; step-by-step and backward theory-based evaluation thinking; or the quick exit tree mentioned in **§5.2.2**.

Figure 28: Preliminary proposal of prototype of i-FRAME 2.0 Simulator Web-Platform



Source: Presentation by G. Misuraca, at the Final IESI Conference, Brussels, 14-15 March 2017

In addition, an **Interactive Support Tool (IST) to funnel users to the 'i-FRAME Simulator' could be developed as part of the i-FRAME Web Platform**. Direct users will be able to take a flexible approach, according to their degree of expertise and prior knowledge, to alternative or complementary simulation modelling (and related software packages already available when possible) that could be useful to address specific problems or policy issues.

The 'i-FRAME Simulator' could be used as a support tool for policy modelling which would engage policymakers, representatives of stakeholders, domain experts and modellers, in more or less formalised and structured group-model building or policy lab/system design sessions. These sessions could be either 'real-time' or 'on demand', by setting up specific virtual policy lab sessions and/or workshops to be attended in person that could also serve as capacity building activities.

The JRC has been experimenting with specific software packages already on the market for system dynamics and their possible hybridisation with Agent-based Modelling Simulation (e.g. Vensim, Anylogic) with a focus on ICT-enabled social innovation (as described in **Chapter 4**). In addition, the JRC is currently developing, with the support of both external and in-house resources, the prototype of some components for developing the i-FRAME Web Platform.

In this context, a specific experiment is being conducted on the use and extension of **Macro-economic Agent-Based Models (MABMs) from the 'Keynes plus Schumpeter' (K+S) family** (Dosi et al., 2010; Dosi et al., 2014; Fagiolo and Dosi, 2003; Gerst, et al., 2013; Lamperti, et al., 2016a; Roventini and Fagiolo, 2016).

Based on the findings of the literature reviews conducted as part of the i-FRAME development, in both versions 1.5 and 2.0, these are considered to be more flexible tools than other traditional models (e.g. QUEST, RHOMOLO, GEM-E3, NEMESIS). They allow a fine-grained analysis of microeconomic dynamics leading to a variety of aggregate phenomena, including but not limited to, self-sustained growth, employment fluctuations and greenhouse gas emissions. More details on the model proposed and the experimental simulations being designed are reported in **§5.3**.

Here below we briefly anticipate some of the technical features that will be developed as part of the prototyping of an **interactive support tool to funnel users to the 'i-FRAME Simulator', with specific regard to the extended K+S Modules developed *ad hoc* for i-FRAME (SIT-K+S).** This tool will provide a user-friendly, web-based interface to the K+S simulation model for policy-making and general usage (K+S Web Interface - KSWI). It will offer a basic subset of the computer tools available for the configuration, execution, analysis of data produced by existing K+S model versions and the export of this data to other software packages.

The K+S Web Interface has a front- and a back-end, which communicate to allow the user to:

(1) configure existing models (i.e. change the model's parameters and initial conditions and define the simulation settings),

(2) run the configured models (showing the execution status),

(3) analyse the model results (presenting the produced time series in tabular and graphical formats), and

(4) export results data (as text files).

The front- and the back-ends will communicate over secure standard HTTPS protocols. Other than that, KSWI does not include any special security option. User sessions are open (no id/password required) and no user data is kept on the server side (except non-identified temporary configurations and simulation results data).

KSWI will be provided with non-exclusive use rights on the corresponding compiled code, according to the GNU General Public License version 3 (GPLv3). KSWI, and the prototypes of the other front-end components of the i-FRAME web platform will be developed using standards-based technologies whenever possible, preferably provided under the open/public licensing models.

The prototype of the software applications which compose the final version of the i-FRAME 2.0 as a computer-based simulation model could be finally integrated into the i-FRAME Web-Platform and relational database, developed and hosted at JRC-Server and compliant with Commission IT governance rules and regulations.

5.3 Less is more: from a 10 to a 6-step approach beyond i-FRAME 2.0

5.3.1 i-FRAME 2.0 approach for evidence informed social policy innovation

In this final section on the revised i-FRAME 2.0, we further substantiate how the framework could become an effective tool for evidence informed social policy innovation. To this end, the 10-step Decalogue presented in version 1.5 of the i-FRAME has been revised to include not only the insights from the final phase of the research but also the preliminary results of the testing and validation phase of i-FRAME 2.0. Thus, by looking beyond i-FRAME 2.0 it is possible to envisage what could be developed from 2018 onwards.

The main aims of i-FRAME 2.0 are to:

1) develop a dynamic 'Knowledge Base on Social Policy Innovation';
2) design a fully-fledged i-FRAME simulator of social policy impact;
3) contribute to monitoring the implementation of the EU Pillar of Social Rights and Member States' policies for modernising Social Protection Systems.

As regards objective 3, it must be said that a stable system of national points of contact will have to be established in order to monitor the implementation of the EU Pillar of Social Rights and Member States' policies for modernising social protection systems. Alternatively, a multi-year benchmarking study could be set up. Further review of the literature and case studies to be conducted under the future i-FRAME research could provide exploratory evidence and help design the future monitoring systems. These could then support the establishment of a structured approach to monitoring social policy implementation that could be included in the European Semester.

Once set-up and fully functioning, the i-FRAME Web Platform and Simulator would be able to provide scientific advice to relevant actors, at Member State or Commission level, including the newly established Structural Reform Support Service of the European Commission's General Secretariat. This advice could support evidence-informed social policy innovation and help Member States to design more effective labour market policies and modernise their social protection systems.

Yet, for our purpose, the important developments concern objectives 1 and 2, as they will be the key pillars of the i-FRAME Platform and the operationalisation of the methodological approach proposed. In this regard, as already anticipated in **§5.2.3** the envisioned structure and high-level functionalities of the i-FRAME Web Platform shall integrate a number of different software application 'suites'.

These should be linked either to the micro-data gathering and measurement activities of initiatives collected through the IESI relational database and web-tool developed by JRC to support the mapping activities and *ad hoc* in depth case studies, or to the computer-based platform to support the simulation modelling proposed as part of the i-FRAME methodology.

Here, we focus briefly on the methodological approach to implementing what we have labelled as **'Evidence-Informed Social Policy Innovation' warehouse**. Whereas some components of the i-FRAME 1.5 Decalogue still underpin the final proposal for the development of i-FRAME 2.0, an important element of the revised methodology is that it is not tied to any particular technique and is more generally usable regardless of the specific support tools one want/need/can use.[39]

Furthermore, the improved approach for i-FRAME 2.0 envisages that some or all of the steps we propose could be conducted as policy lab sessions where group work would enable us to extract knowledge from experts and users across the various dimensions of the 'diamond' depicted in **§5.1**, i.e. Deliberation & design followed by *ex-ante*, *in-itinere* and *ex-post* evaluations.

39 The i-FRAME 1.5 Decalogue, in fact, was instrumentally shaped around a specific tool and approach: Small System Dynamics based on a formalised Group Model Building (GMB) procedure.

This interactive approach would help the i-FRAME to become a reference methodological framework to: **a) guide policymakers and practitioners on what evidence and tools/methods are available for their needs, and b) help them run simulations and/or measure and evaluate impacts.** Whereas the former largely covers the deliberation and design phase, the latter covers all other dimensions of the diamond depicted above.

The proposed approach can be implemented by applying the following steps and using the operational components and tools envisaged to equip the i-FRAME Platform:

1. **Problem and ecosystem functioning**. Define the problem an intervention aims to address within the functioning of a given ecosystem; i.e., problem tree;
2. **Interactive discussion on causal relationships**. Engage stakeholders and experts in a discussion on possible causal logic; i.e., theory-based thinking, quick exit trees;
3. **What worked elsewhere**. Engage stakeholders and experts in a discussion of the suitability for a given intervention of what worked elsewhere; i.e., interactive evidence-informed social policy innovation warehouse (discussed in more detail in **§5.3.2**);
4. **Decide and design the intervention**. The final deliberation and design of an intervention must follow formal and prescribed country-specific rules. Yet, in a policy lab context, this step could be an exercise and should strategically embed the suitable measurement and evaluation methods/tools in the design of the intervention from the very beginning;
5. **Identify key variables**. This to a large extent corresponds to steps 2 and 3 of version 1.5, namely definition of the input, output, outcomes, and impacts to be measured and evaluated. It can be implemented using 'traditional' tools such as intervention logic models, Causal Loop Diagrams (CLDs), and other support techniques, including Group-Model Building, Focus Groups; Interviews; Experts Insights; etc.
6. **Run simulations and/or measure/evaluate (*ex-ante*, *in-itinere*, *ex-post*)**. Depending on the previous steps and on the nature of the intervention, simulations, measurements, or evaluations could be run using the insights from the evidence warehouse. In addition, already developed simulations and models could be used (or re-used where possible) according to hypothetical scenarios of use or tested against real-life case studies. In this case, there are several possible tools which could be used, depending on the resources and scope of the future research activities. Besides i-FRAME 2.0, specific experiments could be conducted using either the methods proposed in the i-FRAME 1.5 (namely, a hybridisation of System Dynamics and Agent-Based Modelling Simulations) or a further development of the experiments and modules prototyped *ad hoc* for ALMP using the K+S simulation model (see **§5.2.3** and below).

5.3.2 Evidence Informed Social Policy Innovation warehouse

In view of the revised meta-framework and of the six steps described above, we propose that Objective 1 (i.e. the development of a dynamic 'Knowledge Base on Social Policy Innovation) could lead to the production of a **pluralistic, open, interactive and ICT-enabled warehouse for evidence-informed social policy innovations**.

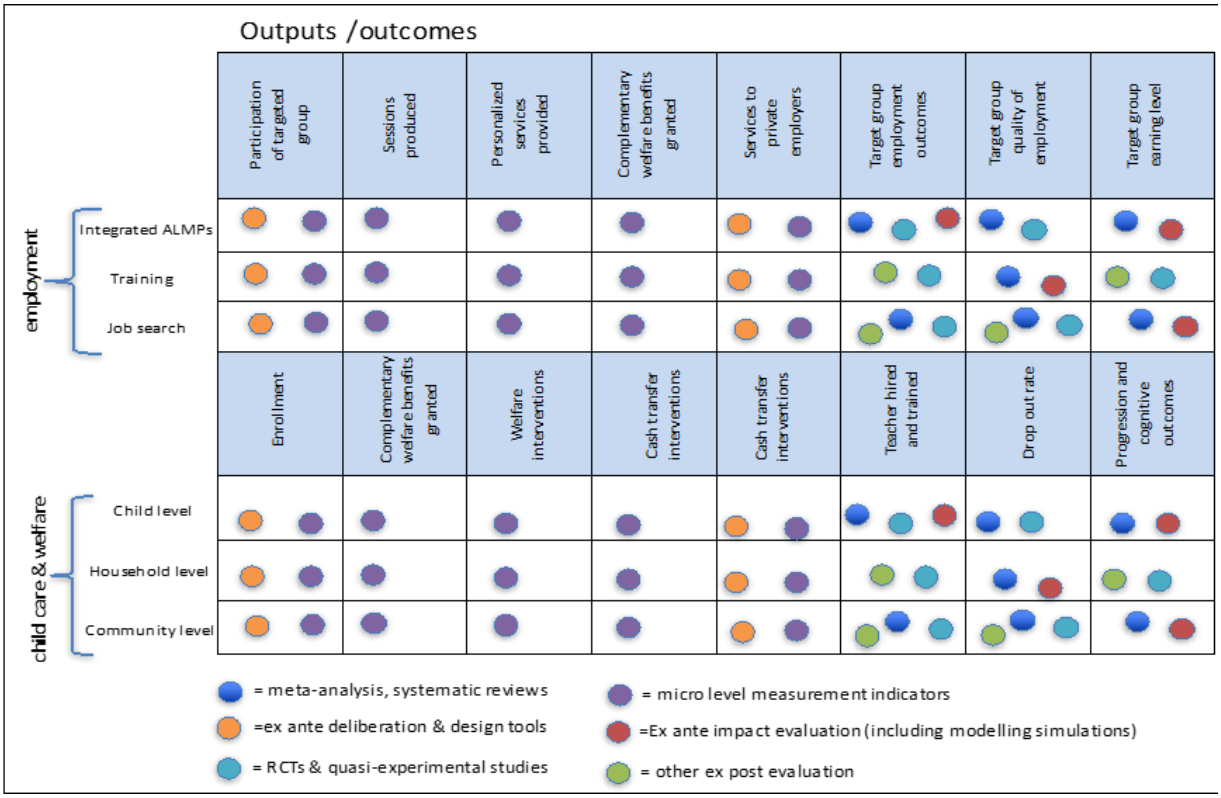
Figure 29 shows what this warehouse would look like for two different policies (i.e. employment; child care and welfare. This is just a diagram which has been filled in hypothetically. It is limited not only with respect to the many other policy domains that could have been added, but also in interventions (the rows) and in outputs and outcomes (the columns) included for the two domains exemplified.

Imagine that this diagram is placed into a web-based interface that is interactive and dynamic, and that it is accessed by a policymaker or practitioner who is interested in, for example, the employment outcomes of integrated Active Labour Market Policies (ALMPs). He or she would be led to structured and organised information on the various tools and sources of evidence by clicking on different coloured circles. He/she could also be led to tutorials or simulations, and to the various tools illustrated as possible operational components in **§5.2**.

This interface would become an invaluable instrument for the community of practitioners and experts, especially in policy lab sessions or in more traditional capacity building activities.

This vision embeds the lessons learned from the critiques we made of orthodox EBP and, thus the warehouse shall gather evidence based on a wide range of methodologies, and shall substitute hierarchies of evidence with the contextualisation of what is useful for each purpose.

Figure 29: Interactive and dynamic warehouse for evidence-informed social policy innovation



Source: Open Evidence for JRC, 2017

To build a warehouse of this kind, greater effort and time are needed. Possibly, at the end of this piloting phase, the results achieved will lead to a new research stream, along the lines of the suggestions advanced in **Chapter 6** of this report.

The experimental macro-level simulations, which are carried out using the **K+S Macro Agent-Based Model**, represent a first step towards this broader goal. After that, further progress will require to develop new modules of the K+S model, and to test and develop alternative tools (i.e. System Dynamics, Discrete Event Models, hybridisation of System Dynamics with Agent-Based Modelling Simulations).

A roadmap for building a fully-fledged i-FRAME simulator of social policy impact, both in terms of further K+S improvements and of using alternative instruments, will be produced at the end of the development phase and the pilot of the prototype i-FRAME 2.0 in 2018.

5.3.3 i-FRAME 2.0 extended modules of the K+S Macro Agent-Based Model

As an illustration of the i-FRAME 2.0 simulation modelling component proposed, we anticipate below the approach being piloted and tested to adapt and extend the family of 'Keynes plus Schumpeter' Macroeconomic Agent-Based Models (K+S MABMs) for **Active Labour Market Policies (ALMP);** and the preliminary conceptualisation for developing a scenario of use on **Mission-Oriented Social Innovation Policy (MOSIP)**.

The K+S MABMs has been developed at the Scuola Superiore Sant'Anna (Dosi et al., 2010; Dosi et al., 2014; Dosi et al., 2016a, 2016b; Fagiolo and Dosi, 2003; Fagiolo and Roventini, 2016; Lamperti et al., 2016a; Lamperti et al., 2016b).

The simulations to be conducted using the K+S model as part of i-FRAME 2.0 must be understood as pilot explorations. They represent one of the many possible policy domains and modelling approaches that could have been chosen.

Labour market policies and services are one area among the many that are included in the concept of PSSGI. The special focus on the labour market was the choice of the research team, justified on two grounds. First, it is uncontroversial that unemployment and long-term unemployment are among the most pressing social problems at the moment and are social policy priorities for both the EU and the Member States. Second, it is in this domain that the systematic review found the most solid empirical evidence, which is being used in developing the *ad hoc* module of the K+S model for i-FRAME.

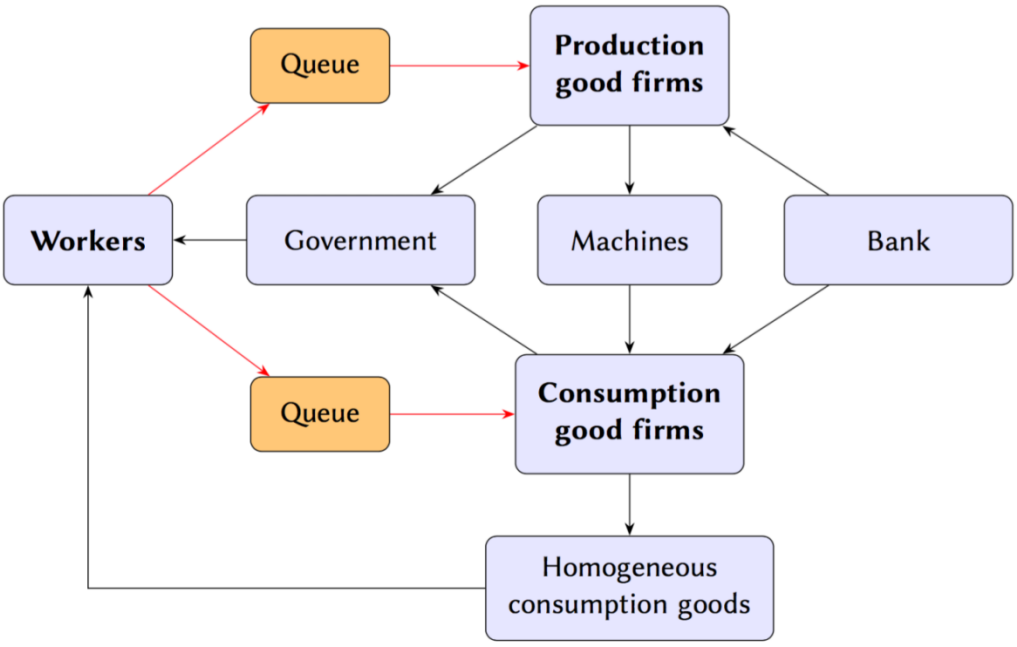
A Macro Economic Agent-Based Model was also a choice made from the growing family of modelling tools (which have been reviewed as part of the i-FRAME research). This does not mean that i-FRAME has abandoned the focus on social science approaches to embrace a more economic form of orthodoxy. First of all, the K+S model is very different from orthodox macro-economic models, and in its logic there is space for the role of institutions. In addition, the assumptions about the behaviour of individuals in a K+S model are inspired by the concept of bounded rationality and the application of behavioural rules based on empirically-documented heuristics.

Needless to say, we pay a price for the macro perspective in terms of the granularity of the transmission mechanisms of the various possible policy innovations. On the other hand, this perspective provides some scenarios of potential macro impacts that could encourage policymakers to act and researchers to develop more granular micro-simulations.

The K+S family of models builds on evolutionary roots (Nelson & Winter, 1982), but it is also in tune with genuine Keynesian insights (see e.g. Stiglitz, 1994a). It tries to explore the feedback between factors influencing aggregate demand and those driving technological change. In doing so, it begins to offer a unified framework, which accounts for long-term dynamics and short- and medium-term frequency fluctuations at the same time. The K+S model is structural, in the sense that it explicitly builds on a representation of what agents do, how they adjust, how they interact, and how they respond to policy changes.

Recently, building on Dosi et al. (2010), the K+S model has been extended to account for firm-worker interactions in a decentralised labour market (Dosi et al. 2016a, b). The model is portrayed in **Figure 30** (see **Annex II** for a full description).

Figure 30: The K+S model with the labour-market extension



Source: Sant'Anna School of Advances Studies for JRC, 2017

As part of the final phase of the IESI research a specific module of the K+S for i-FRAME has been developed and piloted on Active Labour Market Policies (ALPM). In particular, the rationale for developing the **K+S i-FRAME module on Active Labour Market Policies (ALMP)** and some preliminary results of the simulations conducted are presented here below.

Since 2008, the world economy has been facing a severe recession. The European economy appears to be in a vicious circle of low growth, stagnating productivity and wages. Notions like jobless recovery, unemployment hysteresis, and secular stagnation have gained momentum and are receiving a lot of attention in both academic and policy debates.

Some long-term patterns, particularly apparent in the US economy but generally occurring across developed countries, indicate the emergence of new and worrying trends both in labour markets and the whole macroeconomic machinery. These are:

i) de-industrialisation;

ii) stagnant wages and divergence between productivity growth and wage growth;

iii) declining labour share and related, massive surge in corporate profits, especially financial ones;

iv) declining labour force participation;

v) declining business dynamism and net job creation;

vi) soaring inequality;

vii) skills polarisation;

viii) growing number of part-time jobs;

ix) longer unemployment spells; and

x) hysteresis[40].

Technology is probably only one of the original causes of these long-term patterns. Institutional determinants like globalisation, financialisation, labour market liberalisation, the declining share of both manufacturing and union density are also playing a major role in the current phase of capitalistic re-organization, triggering potentially prolonged phases of economic instability.

Policy institutions need to understand what instruments can be used to mitigate, and potentially reverse these long-term trends. They also need to accurately assess the short- and long-term effects of different types of structural reforms on the labour markets.

As part of the pilot and testing of i-FRAME 2.0, we used the K+S model to study the relation between the institutional conditions of the labour market, declined under two alternative *'Fordist'* and *'Competitive'* scenarios, and the effects of labour market structural reforms.

In particular, we studied the effects of structural reforms which aimed to:

i) increase numerical flexibility,

ii) lower the pass trough of productivity growth upon wage growth,

iii) reduce unemployment benefits and minimum wages.

To study these policies, we tested different types of firing schemes, which go from temporary to permanent type of contracts. We detected that structural reforms do indeed affect aggregate macroeconomic performance, in terms of productivity and GDP growth rate and variance, unemployment, personal and functional income inequality.

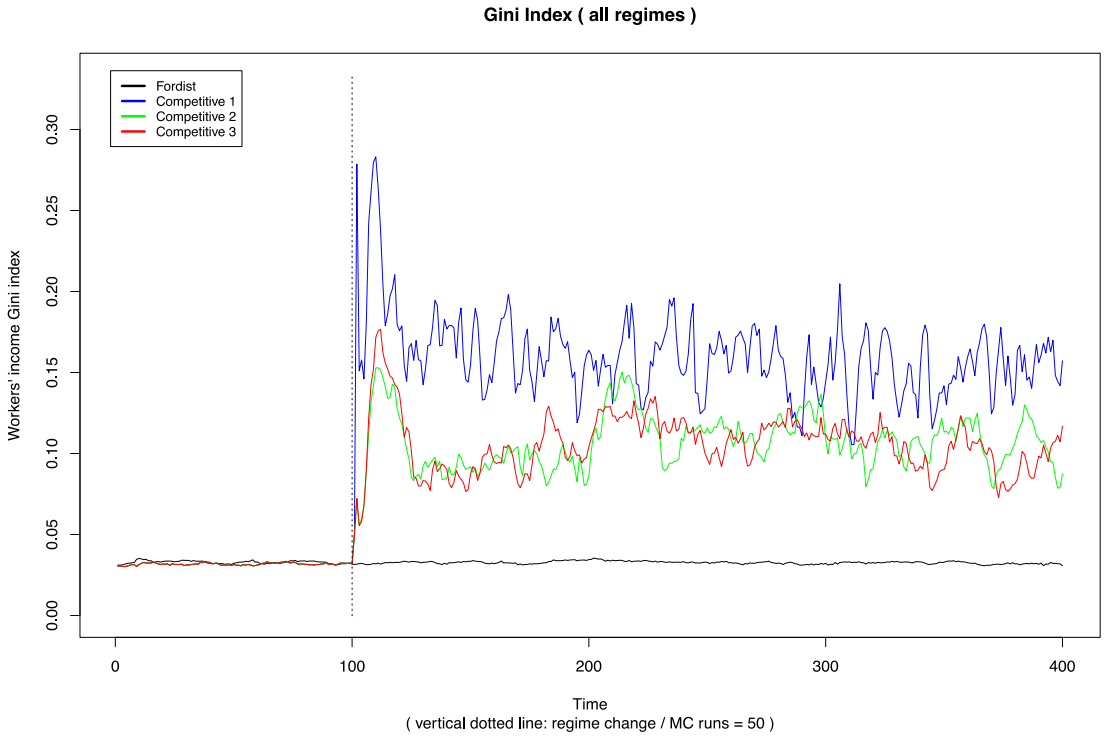
Simulation results show that structural reforms which aim to increase the flexibility of the labour market worsen the performance of the economy. More specifically, they increase GDP volatility, the unemployment rate, and inequality (see e.g. **Figures 31** and **32**).

[40] Hysteresis refers to an even that persists in a system even when the factors that caused it no longer occur. For instance, the unemployment rate after a recession may remain at a higher level than before the recession, even after GDP goes back to normal growth.

Figure 31: Labour market structural reforms: impact on unemployment and vacancy rates

Source: Sant'Anna School of Advances Studies, 2017

Figure 32: Labour market structural reforms: impact on inequality



Source: Sant'Anna School of Advances Studies, 2017

In order to pursue the simulation objectives and extend the K+S model, it will be enriched to account for: a) an endogenous process of skills accumulation by workers; b) a state-dependent process of entry; and c) a process of discouragement in the job-search activity.

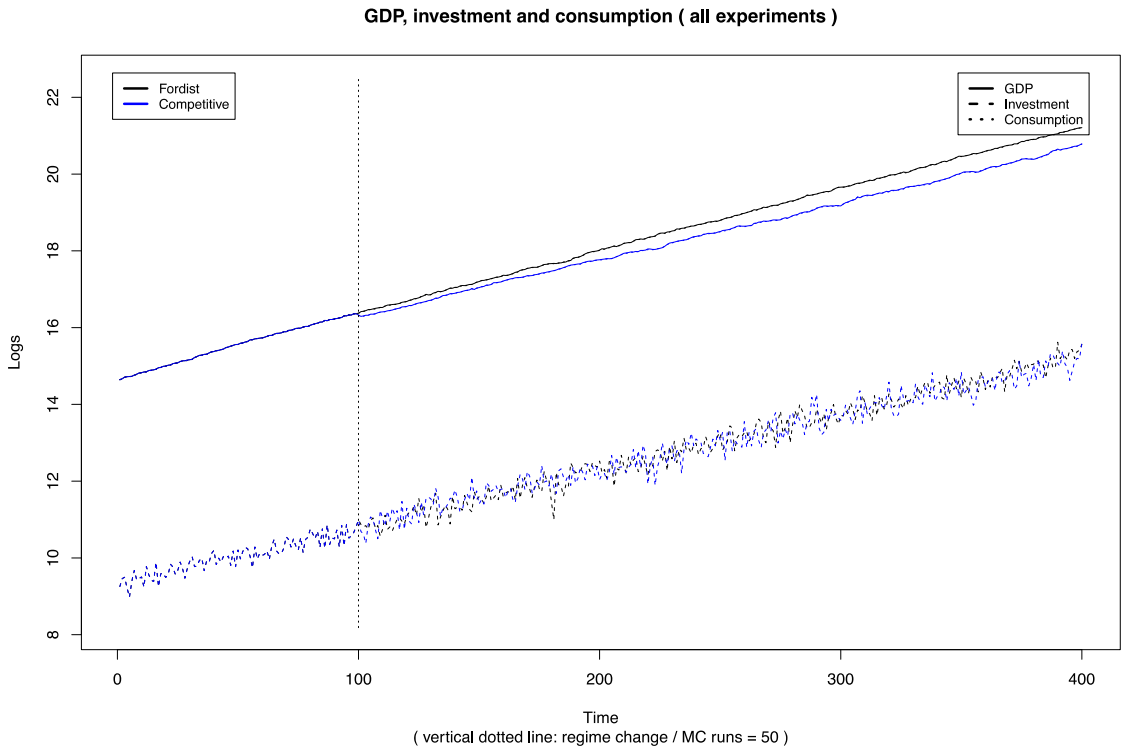
Detecting the sources of hysteresis will allow policymakers to better design ALMP. In fact, hysteresis is both a micro and macroeconomic phenomenon, according to which transitory shocks may last for long periods, preventing the system from returning to the pre-shock level. For example, a recession can persistently increase the structural unemployment rate.

Recent evidence suggests that hysteresis is becoming ubiquitous, particularly in the aftermath of the Great Recession. There are many potential sources of hysteresis, which can be particularly pronounced during downturns, for example: declining innovation, diffusion, and investment rates due to the lack of demand opportunities; lower entry dynamics due in part to the tightness of credit markets; skills deterioration processes of firm-based capabilities and labour force discouragement.

The latter are some of the causes of long-term unemployment and permanently lower output growth. The K+S model can account for the endogenous emergence of hysteresis in GDP and unemployment and detect to what extent structural reforms which aim to make the labour market more flexible might favour the emergence of hysteresis.

Preliminary simulation results show that labour-market structural reforms do indeed favour the emergence of hysteresis and worsen both the short- and long-term performance of the economy (see **Figure 33**).

Figure 33: Labour market structural reforms and the emergence of hysteresis



Source: Sant'Anna School of Advances Studies, 2017

If growing numbers of workers experience long term unemployment spells (which is the case in many Mediterranean regions), the labour force participation rate may fall, as workers will be discouraged from searching for a job. After modelling the pattern of increasing labour force discouragement and decreasing participation rates, we will have more detailed diagnostic instruments to examine the effects of a set of ALMP. If there were no diagnostic phase in which the model can be enriched and tested to account for the empirical stylised facts, the policy exercises could not be undertaken.

After the empirical validation of the new mechanisms inbuilt into the model it would be possible to carry out policy experiments to understand how hysteresis, for example, can be cured by active intervention on the part of institutions. In particular, we might then test the effects of: a) Active labour market training policies directed at different cohorts of workers; b) Policy aimed at public skills enhancement; c) Unemployment insurance vis-à-vis permanent lay-off; and d) Labour hoarding and wage reduction vis-a-vis permanent lay-off.

In addition to developing and testing the K+S i-FRAME module on Active Labour Market Policies (ALMP), the JRC in collaboration with external experts conducting a support study for operationalising the i-FRAME 2.0 is also defining a simulation modelling module on Mission-Oriented Social Innovation Policy, borrowing in part from the concept of Mission Oriented Innovation *à la Mazzucato* (see Mazzucato, M., 2013).

The rationale and foundational principle for the K+S i-FRAME **Mission-Oriented Social Innovation Policy (MOSIP)** are described below and are currently under further elaboration. In the current research this is limited to conceptual and theoretical developments for future simulations of the impact of Mission Oriented Social Innovation Policies.

This proof-of-concept will not entail any development of the K+S model during the current research; nevertheless, a stylised and abstract development of the K+S model in order to eventually extend and simulate the Entrepreneurial State concept developed by Mazzucato[41] from the domain of R&D and technology to that of social policy innovation, is being elaborated and will be proposed as a blueprint for future additional developments to the i-FRAME in 2018.

In this respect, recalling the typologies of social policy and service innovation proposed in **§5.1** (**Table 3**), it is our contention that total systemic innovation could be seen as analogous to the Mazzucato's concept of mission oriented policies (2015a). Thus, Mission Oriented (Social) Innovation Policy *à la Mazzucato* fits the typology of total systemic innovation.

To show this we can apply and rephrase the following excerpt from Mazzucato *'Rather than focusing on particular sectors – as in traditional industrial policy – mission-oriented policy focuses on problem-specific societal challenges, which many different sectors interact to solve. The focus on problems, and new types of collaborations between public and private actors to solve them, creates the potential for greater spillovers than a sectoral approach…… The new framework seeks to better envision, justify, measure and assess public investments, working within an eco-system of public, private and third sector actors across the innovation chain. It focuses on the role of the state as shaping and creating markets, not only fixing them – and enables the development of economic policy to be informed by a broader theoretical underpinning'*.

Today the way in which the role of the State is conceived is crucial for future recovery and growth. This is because in most parts of the world we are witnessing a massive withdrawal of the State, one that has been justified in terms of debt reduction and – perhaps more systematically – in terms of rendering the economy more dynamic, competitive and innovative (Mazzucato, 2015b). Business is accepted as the innovative force, while the State is cast as inertial – necessary for the basics, but too large and heavy to be the dynamic engine. Mazzucato (2015a) has largely dismantled this view and showed that major, revolutionary technological changes had substantially benefited from an active role of the government (i) in directing and funding (on its own) the process of R&D and, on the other side, (ii) in taking the risk that private business alone had not be willing to sustain. There is little reason today to think that the role of the public government would be less important in solving contemporary major societal challenges and sustain value creation directly from the public sector.

So, one could envisage a **Socially Entrepreneurial State** that would, at the same time, push and support the integrated production of services, new financial instruments and procurement rule to tackle, for instance, the goal of keeping older workers on the market with skills, job policies, and healthcare prevention policies.

41 Mazzucato, M. (2015a). The Entrepreneurial State: Debunking Public vs. Private Sector Myths. London: Anthem Press.
Mazzucato, M. (2015b). The green entrepreneurial state: SPRU working paper series, 2015-28.

Moreover, a number of new and **innovative financial instruments** have been developed and or adapted in the recent years to facilitate access to funding for promoting social policy innovation initiatives and strengthening 'social infrastructures' across the EU.[42]

Financial instruments are presented by the Commission as resource-efficient way of deploying cohesion policy resources. Targeting projects with potential economic viability, financial instruments provide support for investments by way of loans, guarantees, equity and other risk-bearing mechanisms, possibly combined with technical support, interest rate subsidies or guarantee fee subsidies within the same operation.

In the 2014-2020 period, the Commission is encouraging Member States to double their European Structural and Investment Funds (ESIF) used through such financial instruments.

Among such financial instruments there are, for instance: 1) **risk-sharing loans**, based on the sharing of risks between public and private resources; 2) **capped guarantee instruments**, where public money acts as guarantee against default inside a bank's loan portfolio. Both instruments aim to provide SMEs with better access to finance; and 3) **renovation loans**, for energy efficiency and renewable energy projects in the residential building sector.

The Commission is also launching two new instruments that are particularly interesting as they could be suitable for building scenarios of use for simulation modelling under the i-FRAME approach, and to illustrate a possible re-thinking of the investment orientations in the field of social policy innovation (see focus box below).

Selected new financial instruments to support Social Policy Innovation

The European Commission adopted two new 'off-the-shelf', i.e. ready-to-use financial instruments for European Structural investment Funds (ESIF).

Off-the-shelf financial instruments are designed to increase the take-up by Member States of revolving financial support rather than traditional grants, and to combine public and private resources.

The two new instruments the Commission is launching are:

A co-investment facility to provide funding to start-ups and SMEs. This support will enable them to develop their business models and attract additional funding through a collective investment scheme managed by one main financial intermediary. Total investment combining public and private resources can amount to up to €15 million per SME.

Urban development funds to support sustainable urban projects, in public transport, energy efficiency or the regeneration of urban areas, for example. Projects must be financially viable and part of an Integrated Sustainable Urban Development strategy. Total investment combining public and private resources can amount to up to €20 million per project. The support will take the form of a loan fund managed by a financial intermediary, with ESIF resources and a contribution of at least 30% from private capital.

Source: European Commission, 2017

Despite the fact that the Commission has stressed the potential of the social service sector for creating jobs, austerity and other rules hamper the deployment of public funds to this purpose. This is part explained by the **controversy on the extent to which EU rules on State aid, internal market and public procurement apply to social services**.

Whereas new financial instruments to support social policies have been introduced, the idea of the Socially Entrepreneurial State run against the wall of the debate on whether or not EU rules on State aid, internal market and public procurement apply to social services.

42 See for instance the FI-COMPASS Handbooks on Financial instruments under the ESF and EFSI, including microfinance (2016); and on Innovative use of financial instruments within the ESF (2017), available at: https://www.fi-compass.eu

This debate has dominated the political scene for at least the last decade. Indeed, in recent years, several public authorities and civil society organisations representing service users and providers have claimed that the EU rules create unnecessary difficulties. For instance, the Informal Network of Social Service Providers (INSSP) published a report of a seminar about the impact of EU legislation on social services which states that the EU rules *'in many cases impact in a negative manner on the sector of social NGOs, part of the social economy, and specifically on the quality of social services'. INSSP admits however that the negative effects 'are not only due to the EU rules but also linked to the way national and local authorities implement these rules. Some authorities misunderstand the rules or implement them in a way that is more restrictive than necessary ...*'

The Commission has argued against these views, explaining that EU rules already take into account the specific characteristics of social services and that, if the public authorities apply them correctly, these rules can help them organise and finance high-quality cost-effective social services in a transparent manner. Member States have an ample choice of modes of organisations of the services in line with their traditions and cultural backgrounds.

Against this context **the proposed i-FRAME K+S MOSIP simulation modelling 'scenario of use' envisages integrated interventions that are not merely public sector intervention, rather see the state as a sort of entrepreneurial incubator enabling societal and private actors to leverage public and private funds.**

In the framework of piloting and testing the i-FRAME 2.0, by means of the K+S model, it would be possible to provide a proof-of-concept of the role of mission oriented social innovation policy interventions for triggering the emergence of a new paradigm that would favour the transition towards a more socially and environmentally sustainable growth pattern. This will also investigate the role of green jobs in the context of employment dynamics (along the path suggested in Mazzucato, 2015a and 2015b).

This includes building on the existing environmental module of K+S and links it to the following MOSIP scenario that should be further theorised and embedded into the model in the future:

Social enterprises leveraging on financial resources for urban renewal engage either in helping people restructuring their house with energy efficient solutions or build smart and energy efficient homes and public infrastructures.

This type of policy would aim at the same time at:

(a) creating new green jobs in social enterprises;

(b) provide support to disadvantaged social groups;

(c) contribute to community building or re-building and urban renewal.

By doing so, we could tackle social inclusion impacts, the issue of social impact investing (for energy efficient and environmentally friendly urban renewal) and the issue of distributional inequality concerning both income and wealth.

This would require the development of a housing market and a real-estate sector, possibly endowed with a spatially explicit structure, as a new module of the model.

Further, such a step will require enriching the financial sector, including additional actors other than standard commercial banks and, as a consequence, different financial instruments than bonds and loans, which would mimic those described earlier and already available as part of the portfolio of financial instruments that can be used to implement the European Structural and Investment Funds (ESIF) in the current and next programming period.

In this perspective, the results of simulations that could be developed through operationalising this scenario of use may contribute to the current debate on the future of the European Social Fund (ESF) and its combination with the European Fund for Strategic Investment (EFSI).

6 Conclusions: paving the way to i-FRAME 3.0 and beyond

Summary of content of Chapter 6

This chapter draws conclusions on future research directions and start paving the way to i-FRAME 3.0 and beyond.

It is organised as follows:

§6.1 summarises the key results achieved by the research so far, elaborating on the improvements proposed for the methodological framework - i-FRAME 2.0

§6.2 discusses research directions that could be followed to further develop a fully-fledged i-FRAME Simulator of social policy impact – i-FRAME3.0;

§6.3 recommends further support for the i-FRAME, and discusses the contribution it could make to the current debate on strengthening the social dimension of the EMU and the future of welfare systems in the EU.

6.1 Beyond reductionist and positivist evidence-based policy

In order to appreciate fully the main results achieved during the designing and building of the i-FRAME, it is important to briefly recall the two main objectives of the underlying IESI research in general and of the i-FRAME in particular:

- to help policymakers and practitioners better understand the 'Social Policy Innovation Ecosystems' where their interventions take place in the deliberation phase, and
- to develop micro-macro operational tools for the design and evaluation (*ex-ante*, *in-itinere*, and *ex-post*) of these interventions.

To achieve these objectives a distinction has been made between the meta-framework and the specific micro and macro operational components that have been proposed, developed and/or piloted during the research. This distinction can help us understand the methodological approach used in the development of the i-FRAME so far and the way forward to i-FRAME 3.0.

The **meta-framework** encompasses both objectives, whereas the **operational components** focus on pragmatic micro-level measurement tools, computer-based instruments for data gathering and analysis, and macro-level simulation modelling approaches rooted in complex systems theories. In both cases, a modular approach for development, testing, and validation was adopted.

As amply demonstrated by the findings of the literature reviews conducted during this research, it was necessary to deconstruct and interpret social policy innovation ecosystems using complexity thinking and tools in order to understand them. In some cases, this exercise could be conducted by using more formalised techniques such as modelling simulations that include Agent-Based Models (ABMs), System Dynamics (SD), AMB/SD hybridisation, and Social Network Analysis (SNA), all of which can be informed by behavioural insights. However, when this is not possible, ecosystems could be reconstructed through in-depth qualitative case studies, which in turn fed into, and supported, the micro- and macro-level operational tools.

In this respect, the **final proposal for developing a methodological framework to assess social policy innovation promoting social investment - i-FRAME 2.0** kept both dimensions together, by developing and piloting the various operational components in diverse stages of development and application domains, as well as different timeframes.

This approach follows almost naturally from the critique of orthodox evidence-based policy (EBP) we have advanced, based on a growing body of academic literature from which we have drawn selectively. **The i-FRAME approach is to move from reductionist and positivist evidence-based policy to a more paradigmatically and methodologically pluralistic 'evidence-informed policy' (EIP)**.

This critique of orthodox and deterministic approaches to evidence-based policy is fully in line with the current debate on the **need for system thinking to tackle 'wicked' policy issues** (OECD, 2017). The relationship between the cause and effect of wicked problems such as long-term unemployment, income inequality, and poverty is unclear and there seem to be no easy solutions (OECD, 2017, p. 5). These contexts require not only integrated inter-institutional policies, but also new analytical tools that can better deal with uncertainty and complexity. Policy analysis should accommodate complexity rather than filter it out, using outdated and reductionist tools.

As stated by the OECD (2017, pp. 12-13): '*as policy problems have changed toward systemic, interdependent challenges, their understanding and analysis needs to change. In highly complex problems, the relationships between causes and effects are neither linear nor simplistic*'. Though Randomised Control Trials (RCTs) and their meta-analysis remain important instruments, they are not the only ones available. They cannot be used mechanically as prescribed by certain EBP recipes, because: a) what 'worked there' will not necessarily and automatically 'work here'; and b) some issues are too complex for classic experimental design.

The EBP orthodoxy prescribes what works following an a-critical positivist approach. It treats social sciences and their policy application as though they were in a situation of paradigmatic normality in the sense defined by Kuhn (1970). It is as if one consensual paradigm had been accepted in applied policy work by most social scientists and scholars, who had not challenged its main assumptions, models, hypotheses, and measures. **The reality of social sciences, of applied policy research, and of the study of the relation between science and policy is much more pluralistic and has no dominant paradigm.**

However, in recent years, the 'Evidence-Based Policy' (EBP) agenda has been challenged and the expression turned on its head by authors who talk about 'Policy-Based Evidence Making' (Sanderson, 2011; Strassheim & Kettunen, 2014; Torriti, 2010). There are increasing doubts that science can inform policy as in the classical linear model of the relations between evidence and policy (Pielke, 2007, pp. 12-14). Accordingly, the idea of 'speaking truth to power' (Wildavsky, 1979) by way of scientific advice to politicians and policymakers is being seriously reconsidered. There have been frequent attempts to turn all policy-making into technical exercises that obviate the need for political debate in what has been called technocracy or scientisation (Jasanoff, 1990; Ravetz, 1990; Sarewitz, 2000, 2004). However, in conditions of uncertainty, a detached 'pure science' approach is nothing more than 'stealth issue advocacy' (Pielke, 2007, chapter 5).

In many policy domains (including social policy) values are disputed, facts uncertain, stakes high, and decisions urgent. These are the conditions in which 'post-normal science', was introduced and further developed in various works of Funtowicz and Ravetz (Funtowicz and Ravetz, 1990, 1991, 1993, 2008; Ravetz, 1990). Under these conditions, scholars who advise policymakers should propose several options rather than prescribe hierarchies of what works.

Inspired by the above critical considerations and by the analysis of the limits to orthodox EBP discussed more extensively in **§5.1** the revised i-FRAME 2.0 meta-framework is proposed to be developed as an open and epistemologically pluralistic framework with several operational components that can be used and adapted to the different needs of policymakers and practitioners at different levels (international, national, and local). It should employ at the same time formalised quantitative empirical approaches, theory-based evaluation, modelling simulations, and qualitative methods. This ensemble of tools can be used both in interactive workshops within policy lab sessions and in more traditional capacity-building exercises.

6.2 Future research directions: towards i-FRAME 3.0

In this report, we have presented the findings from the research conducted as part of the IESI study between 2014 and 2016. Based on these findings, we proposed a methodological framework to assess the social and economic impacts of social policy innovations which promote social investment. During the course of the research, this quasi-concept turned out to be a better scope of analysis than focusing strictly on ICT-enabled social innovation potential. We carried out an iterative series of extensive and exhaustive reviews of sources and **set the basis for the development of an open, interactive, and pluralistic platform for evidence-informed social policy innovation.**

In this connection it is important to recall the findings concerning the structuring of the operational components of the i-FRAME 2.0. Though these are still depicted in a high level / generic fashion, they have been developed and tested as **a 'prototype' of a computer-based simulation model** which include:

- tools to support the deliberation and design phase,
- an electronic micro-level measurement toolkit that serves to structure the interactive and dynamic warehouse for evidence-informed social policy innovation (EISPI);
- a Support Interactive Tool (SIT) to funnel users. This tool is being piloted through a specific experiment which aims to apply and extend the Macro-economic Agent-Based Models (MABMs) from the 'Keynes plus Schumpeter' (K+S) family.

In this respect **our proposal lays the foundations for both system-oriented formalised modelling simulations and for theory-based approaches**. The critique of orthodox EBP enabled us to refine and improve the earlier version of i-FRAME (V1.5) especially where the design and deliberation phase was concerned, and to present a revised and integrated 6-step methodological approach, which replaced the previous i-FRAME Decalogue.

We have also started setting the basis for developing a blueprint for conceptual modelling and have proposed and tested several operational components. Building on the results of piloting and validation activities, we designed the revised framework to be in line with the vision for i-FRAME developments beyond 2017. To do so, we engaged experts from diverse research disciplines, representatives of key stakeholders and policymakers at different level. Finally, we paved the way to building the **i-FRAME3.0** between 2018-2020.

By building on the results of the IESI research conducted during the period 2014-2016, we were able to develop and validate the theoretical and methodological approach which underpins the i-FRAME. We proposed a refined and improved design of the operational components for **the i-FRAME 2.0**. The JRC is further developing and piloting, with the support of external experts and stakeholders, a prototype of a computer-based simulation model to implement the overall methodological framework. Once refined, this would enable researchers and policymakers to assess the impacts generated by social policy innovation initiatives which promote social investment in the EU.

We are also validating the conceptual and methodological approach of the i-FRAME 2.0 by applying it to selected case studies and scenarios of use which address social policy innovation promoting social investment. We will consider various domains, levels of governance of service integration implemented in diverse welfare systems and social service delivery models, drawn from different EU Member States. **This work would set the ground for developing a fully-fledged i-FRAME Simulator (V3.0)** to be developed between 2018-2020.

In this regard it is important to make some clarifications with respect to the ambition of this proposal and its **possible way forward**.

First of all, the i-FRAME in its current version 2.0 is still at the early stage of development of the operational components that are envisaged in its comprehensive approach. Some of the proposed tools may change in light of empirical work and testing in case studies and scenarios of use - for example, the 'diamond approach' should be further elaborated and refined.

Second, only when the web platform with the developed instruments should be finalised it should be possible to start build capacity by further developing and better operationalising specific aspects underlying the i-FRAME methodological framework. In addition, a handbook and manuals to navigate through the i-FRAME should be developed to facilitate its understanding and use. This should benefit of guidance from experts and diverse communities collaborating with the JRC that should be incorporated into the further development of the i-FRAME. This would help policymakers also to look at what others have done and select the best approach and tools for their purpose.

Third, the use of a Macro-Economic Agent-Based Model which focuses mostly on labour market policy in no way implies that this is the only approach where the i-FRAME shall focus on. It was a choice made from a range of alternatives, in terms of both modelling tools and policy domains that was shaped by the constraints – in terms of timeframe and resources - of the project under which i-FRAME has been originated. As we have seen, the philosophy on which the i-FRAME is based adopts a non-paradigmatic and pluralistic approach to methods and sources to support policy making. In line with this approach, it is clear that there are different modelling approaches and areas of policy that need to be explored, used and tested in the future. The use of K+S mostly for active labour market policies should be seen simply as a first exploration.

Last but not least, the critical stance taken by i-FRAME cannot be considered in anyway as a 'post-modernist' external critique or a 'constructivist critique'. Instead, it is an internal critique that goes back to the principles of the founding fathers of the 1960s experimentalism and quasi-experimentalism movements in support of policy, (e.g. Campbell, Shasish, Cook, and Cronbach). Standing on the shoulders of these giants, we simply show how Evidence-Based Orthodoxy has betrayed fundamental epistemological principles and all the work about internal, construct, ecological, and external validity that was the main contribution of these scholars. Affirming that 'what worked there may not necessarily work here' arises from a truly scientific epistemology that is not as simplistic and ideological as the one proposed by the 'Evidence-Based Policy mantra'. Furthermore, the relevant literature frequently documents how evidence-based policy has been often turned into policy-based evidence-making simply to support specific political agendas.

In this vein, it is our opinion that **the proposed i-FRAME made significant progress towards addressing some important issues in the area of supporting the evaluation of Social Policy Innovation promoting social investment**.

However much more needs to be done. In a future perspective, the i-FRAME has the potential for making a significant contribution especially in setting standards for the use of models for the evaluation of impacts of social policy initiatives. Only a body such JRC could avoid the danger of piecemeal approaches (national or regional), designing and implementing in a comprehensive manner a process of assessing and revising approaches and tools, able to boost the whole field (as with IEEE, W3C or ISO standards).

For this purpose, the further refinement and operationalisation of the i-FRAME shall revisit some of the principles set out in its foundations, building on the rich knowledge repository for social innovation initiatives that have been developed by JRC so far. A number of proof-of-concept use cases shall be chosen together with policymakers, analysts and evaluators and data from the knowledge repository could be used for calibrating simulation experiments for diverse scenarios of use. Results of experiments and test validation shall be then discussed together with policymakers to assess their utility. To this end, **connecting to other initiatives and activities using complex systems approach to support policy making and evaluation is crucial** (e.g. the CECAN, http://www.cecan.ac.uk and the OECD NAEC, http://www.oecd.org/naec) just to mention a few). Financial resources and timeframe should clearly mirror the complexity of objectives and tasks set out for such future developments, which shall focus even more on the needs of policy actors, aiming also at enhancing their capacity to embrace policy modelling.

6.3 Policy implications

The final version of the i-FRAME set the foundations for developing a computer-based simulation model that should encompass various levels of analysis, by using the same structural IT environment (i-FRAME Web Platform and Simulator). **This shall be complemented by concrete technical and policy recommendations for its use and how to scale up the methodological approach**. These recommendations would help the European Commission and relevant organisations in the EU Member States to conduct *ex-ante* analysis of potential impacts of innovative social policy initiatives. They could also help with *in-itinere* and *ex-post* analysis of the impact of the investment implied by these interventions at the end of the policy cycle. In these analyses, possible counter-intuitive behaviours should be taken into account. A flexible approach should be applied to re-calibrating the various operational components developed for simulation modelling, as a consequence of *ex-post* analysis or changes in the theoretical assumptions/causal relationships and/or dynamics hypothesis underlying the model and its components.

To achieve these objectives and carry out this challenging, but very much needed and timely work, **an ambitious research plan should be envisaged**, both to reinforce JRC internal capacities and make available appropriate resources. This should be embedded into a specific high-level science for policy agenda. **Experts and representatives of stakeholders should be closely involved on an ongoing basis**: researchers from relevant scientific communities, and practitioners and policymakers should be called on directly to address concrete and specific complex policy challenges.

For instance, when considering a pressing policy challenge such as **long-term unemployment, especially among the younger generation**, it is evident that the effects of the financial and economic crisis are not limited to (the lack of) economic growth. Tackling these challenges is not only a matter of 'social investment' policies; they create social problems and costs that must be addressed by social insurance and welfare-enhancing policies. Long-term unemployment, for instance, reduces individual and household income, and increases the risk of poverty and exclusion (Addabbo et al., 2012).

Both long-term unemployment and job insecurity and precariousness have been shown to negatively impact on physical and mental health (Burchell, 2009; Herbig et al., 2013; Paul and Moser, 2009; Virtanen et al., 2005). Long-term unemployment can also reduce the individual's human and social capital, as well as trust in public policy and social cohesion (Easterly et al., 2006; Martin, 2014). Precarious jobs become 'traps' as opposed to 'bridges' into secure work, as they reduce social mobility (Cahuc and Kramarz, 2005; Gash, 2008; International Labour Office, 1997).

Trends towards more flexible work have also been associated with growing inequality (Atkinson, 2015; Bernhardt, 2014; Kuttner, 2013, 2016; Standing, 2011; Summers and Balls, 2015). A study using EU-SILC data for 24 European countries shows that the temporarily employed run a higher risk of poverty than permanent workers, mainly due to lower wages (Van Lancker, 2012). The fiscal costs would in the end increase for governments dealing with the social costs of long-term unemployment and job insecurity (Adams and Deakin, 2014).

For these reasons, among many others, social policies as productive factors must address both the economic and the social dimensions of the current crisis, including those instances where they cannot be justified purely in terms of investment, economic performance and efficiency.

This points to the need to strengthen the social dimension of the European Monetary Union, not only in Euro-Area countries, but also in countries about to join the Euro (to set up the economic and political pre-conditions for their access to Euro). Moreover, it calls for the reform of social policies and the modernisation of social protection systems (e.g. through innovations in social service delivery, deinstitutionalisation and other innovative regulatory or financial instruments, including social impact investment, for instance).

This is clearly an area where 'Social Policy Innovation' could contribute to finding a solution. **The i-FRAME 2.0 offers a structured platform and approach which, if developed on a larger scale, could provide evidence and indicate what roads to follow**.

In the same vein, both the social investment perspective and Active Labour Market Policies (ALMPs) to tackle LTU conceive social policies as 'investments' rather than costs. The Commission's public consultation on the EU Pillar of Social Rights (European Commission, 2016d) has reignited the debate on social protection and social policy as a productive factor. This is hardly new: the OECD produced a systematic review of evidence in this domain as early as 2002 (Arjona et al., 2002). In 2005, the International Labour Organisation (ILO) also released a brief entitled 'Social Protection as a Productive Factor' (ILO, 2005).

This approach is based on the idea that **well-designed social policies can constitute a productive factor that actually underpins the performance of the economy**. However, the investment perspective is not sufficient and must be integrated with the idea of 'Social insurance in response to corresponding market failures' and that of 'Social welfare-increasing policies'. In practice, **social policies are considered to be possible stabilizers/correctors of market failures**. The collective cost of these correctors is lower than the cost associated with the market failures, similar to insurance against important risks. It is also possible that policies that require going beyond a mere investment perspective cannot be justified only in terms of their direct effects on economic performance; yet, these policies can be seen as establishing framework conditions that are indirectly conducive to improved economic performance through the generation of overall social welfare. Distributional and equity producing policies can reduce social costs (i.e. less crime, better health outcomes as demonstrated amply by Wilkinson & Pickett, 2009), without reducing competitiveness and economic performance. It has been recognised recently that a **more equal society does not necessarily perform less well or less competitively** (Lagarde, 2015; OECD, 2015a; World Economic Forum, 2015).

Though evidence on the relationship between social policy and economic performance is not conclusive, it suggests a positive rather than a negative correlation (Arjona, et al., 2002; Simões et al., 2014). At a descriptive level, it is uncontroversial that countries with a high share of social spending in GDP often have high economic living-standards as measured by GDP per capita. However, there is not enough evidence yet to establish unequivocally the direction of causation. Obviously, not all social policies are effective and efficiently administered. Thus, it is of the utmost importance that they are assessed with evidence in order to modernise and improve them. In this regard, **the i-FRAME methodological approach could provide a valuable tool to help policymakers better understand the impact of diverse policy interventions**, and possibly simulate new options in different contexts involving various stakeholders. The effective engagement of policy actors and domains is crucial to bring out and share different 'mental models'. Thus, it will be easier reach consensus among diverse, at times alternative, and often conflicting policy options.

The positive results of the preliminary application of the i-FRAME approach open the door to a more extensive and systematic implementation of the proposed methodology at policy level. This could involve building a knowledge repository of simulation models based on a portfolio of cases analysed as part of i-FRAME development and further enriched with new application examples and scenarios of use across the EU and in different policy domains. At the same time, it would require the development of a fully-fledged dynamic electronic toolkit to support policymakers in modelling and simulating in real-time policies and programme interventions included in the i-FRAME knowledge base. To this end, large scale computational modelling and systems simulation tools could be exploited. These are able to capture not only predictable human behaviour through linear top-down forecasting techniques, but also unplanned outcomes of complex interactions, taking advantage of data analytics and computer-based policy modelling. **This would lay the basis for what could be already prospectively called Data-powered i-FRAME 4.0**, which would include real-time structured data inputting from initiatives gathered through the i-FRAME Web-Platform to the i-FRAME social policy innovation simulator. The **Data-powered i-FRAME 4.0** could help the European Commission and EU Member States to monitor the implementation of a revamped 'Social Union', and thus shape a better future for Europe.

Annexes

Annex I - Modelling approaches

A model is a simplified representation of the reality, which is adopted when reality is too complex to be analysed in any form of granular detail, or as a consequence of constraints (time, information, money, etc.) that make experimental methods unfeasible. Still when some data are available and the problem at hand not to complex one can try to analytically solve a model with data to estimate parameters; this is what traditional econometric models (not modelling tools) do. When also this approach proves too complex, then researchers resort to computer based modelling simulations. In doing so, not all variables are of equal importance to the researcher and his/her choices reflect 'implicit' assumptions, rules, and strategies used to solve problems 'explicit' in the model. In view of this premise, the table below provides a synthetic comparison of different modelling approaches.

Table 5: Comparison of models

Ontology	Representative agents	Process oriented top down	Constructivist top down	Bottom up Heterogeneous agents with empirically grounded Behavioural rules
Epistemology	Stochastic causation	Passive entities	mathematical and computer tools express expert knowledge and explicit the structures implicit in the social system modelled	Emergent properties resulting from micro-meso links but not in isolation
Methodology	Equilibrium Prices Vector	Chronological sequence of events	SD logical truths and generic structures identify constants in our social practices Can work with disequilibrium	Empirical validation (ex ante and ex post and using also experimental findings) Can work with disequilibrium
Heterogeneous agents and activities	No	No	No	Yes

Source: own Elaboration

Traditional economic modelling tools rest on unrealistic characterisation of representative agents and the unrealistic assumption of general equilibrium, and do not take into account heterogeneity of agents and activities.

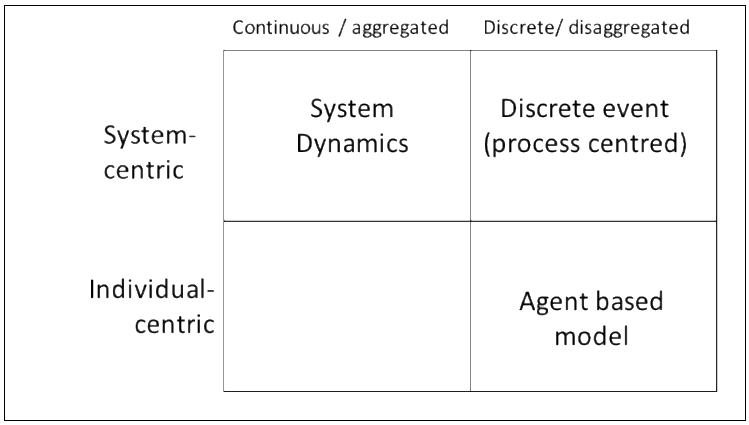
System Dynamics is based on a top down and aggregate view with a strong explanatory power that, however, reflect the mental models of the modellers or the group model building exercises. It is mostly applied in managerial studies and more recently also in policy studies. System dynamics is a perspective and set of conceptual tools that enable to understand the structure and dynamics of complex systems. SD is often used to build management flight simulators-micro-worlds where space and time can be compressed and slowed so one can experience the long-term side effects of decisions, speed learning, develop an understanding of complex systems, and design structures and strategies for greater success. State variables (stock and flows) are linked by algebraic differential equations. They are system centred and do not account for heterogeneity of agents and activities.

Discrete-event simulations are based on the concept of entities, resources and block charts describing entity flow and resource sharing, with passive entities. The focus is on the 'processes' not the 'agents'. In discrete-event simulation, the operation of a system is represented as a chronological sequence of events. Each event occurs at an instant in time and marks a change of state in the system.

Agent based Models (ABM) is a bottom up approach and populated by agents that are autonomous, pro-active, reactive, spatial aware, able to learn and with social abilities, that 'live' in an environment and are driven by behaviour rules defined by 'state charts'. ABM is an essentially decentralised, individual- centric (as opposed to system level) approach to model design. Agent-based models (ABM) as they have been used in social simulation (Balke & Gilbert, 2014) explicitly describe human decision making and range on a continuum from

rather simple interactions among agents to deliberative/cognitive representations. When designing an agent based model the modeller identifies the active entities, the agents (which can be people, companies, projects, assets, vehicles, cities, animals, ships, products, etc.), defines their behaviour (main drivers, reactions, memory, states, ...), puts them in a certain environment, establishes connections, and runs the simulation. The global behaviour then emerges as a result of interactions of many individual behaviours. It combines elements of game theory, complex systems, emergence, computational sociology, multi-agent systems, and evolutionary programming. Leaving aside the traditional economic modelling tools, the other three families of modelling simulation discussed above can also be compared looking at the picture below.

Figure 34: SD, Discrete Events, and ABM



Source: Adapted from (Martin & Schlüter, 2015)

The table below zooms more specifically into the comparison between SD and ABM, from which it clearly emerges in our view the superiority of the latter when dealing with Complex Adaptive Systems characterised by emerging effects and properties.

Table 6: SD and ABM compared

	SD	**ABM**
Perspective	Top down	Bottom up
Main building block	Causal loop	Agent entities
Unit of analysis	System structure	Rule of agent behaviour
Level of modelling	Aggregate system behaviour	Individual agent behaviour
System structure	Pre-determined	Evolvable
Time handling	Continuous	Continuous or discrete

Source: Adapted from (Martin & Schlüter, 2015)

ABMs are clearly preferable when one deals with situations characterised by the presence of: a) identifiable and decentralised agents; b) when the agents are different or the environment is heterogeneous; c) when the interaction between agents is local; d) when agents are adaptive (and adapt their adaptation rules); e) when individual behaviours (and destiny) matters; f) when agents haves spatial presence. Currently, there is much talk about the hybridisation between SD and ABM, although it something easier to say than to do.

In the literature the two models are presented iconic model paradigms in the sense that they are considered as exclusive alternatives to analyse complex systems either from a top-down/aggregate or bottom- up/disaggregate perspective (Swinerd & McNaught, 2012; Vincenot et al., 2011). To the best of our knowledge such hybridisation has been used sequentially only when interfacing a social ecosystem (rendered as ABM) with a natural one (i.e. the condition of a lake) modelled using SD (i.e., Martin & Schlüter, 2015). In a way if one starts from ABM model, including an SD module is equivalent to 'back-boxing' part of the system; vice versa, adding an ABM module to a SD tools means opening a window on more realistic treatments of agent behaviour. The table below compare the three possibilities.

Table 7: SD, ABM, and their hybridisation compared

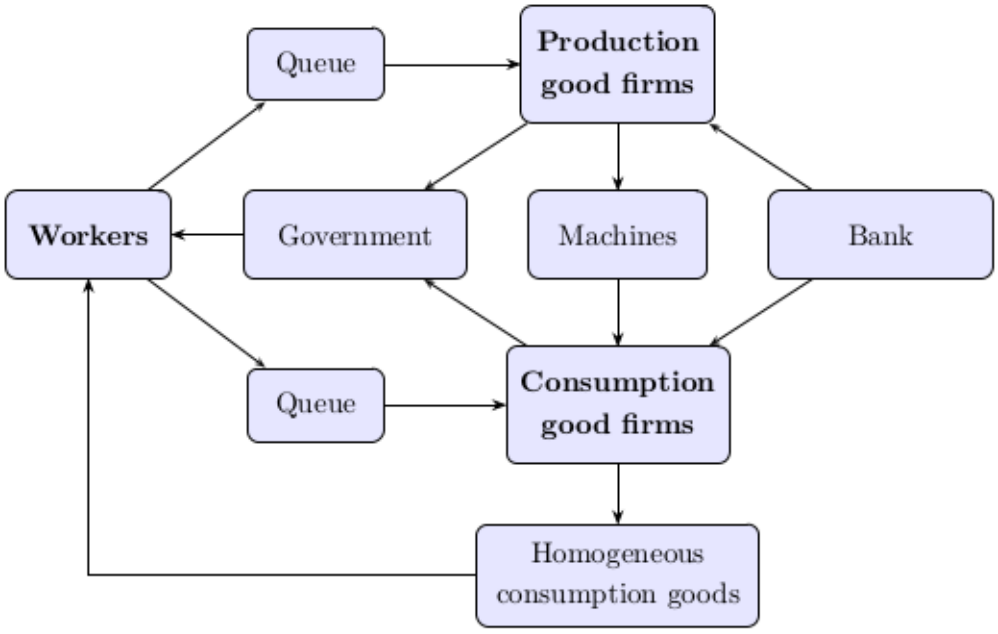
	ABM	SD	Hybrid
Characteristic question	How do emergent system-level patterns develop from micro-level interaction (e.g., spatially, between individuals)?	- How do stocks change or stabilize? (given that rates are constant)	How do changing process rates (impacted by decisions) affect dynamics?
Purposes In general for all: improve system understanding rather than prediction or forecasting	- To identify mechanisms (specific interactions) that are responsible for emerging system-level patterns (disaggregated).	- Which process/feedback is dominating?	- How do changing stocks affect agent states/the distribution of traits?
Focus	- Generate hypotheses, exploration of micro-level behaviour (Epstein, 2008)	Investigate system-level dynamics (aggregated), stability properties of the system, loop dominance, explaining temporal dynamics, projection into the future	Investigating different micro- or system level mechanisms that drive certain dynamics. Generate hypotheses of systems state-change (when does dominance of feedbacks change?) or structural development over time (when does an average trait of agents change?)
Tests for model calibration	Micro-level interactions between entities, network structure (heterogeneous characteristics of individuals/actors, temporal discrete behaviour), transient dynamics	Processes driving accumulation in stocks at (sub-)system level, stable-states, feedbacks (balancing, amplifying), non-linearities	Process of restructuring in a system which can focus either on a structure affecting the processes, or processes affecting the structure
Suitable and traditional analysis tools, typical experiments	Statistical pattern matching—can the model grow patterns that are found in reality?	Stability analysis—under which parameter setting can fixed points/equilibria occur? How stable are they?	Separate sub-system tests (paradigm specific) and qualitative check for the coupled version
Type of outcome	Only through simulations, often with multiple repetitions because of stochastic elements: plotting group/system level characteristics over time (average), evaluating a limited parameter range, describing transient dynamics	Simple models through analytical tools (basins of attraction, bifurcation analysis, overall stability), and more complex through simulations (state space plots from simulations, evaluating stable-states, equilibria)	Through simulations with a focus on either

Source: Adapted from (Martin & Schlüter, 2015)

Annex II – Overview of the K+S model

The economy is composed of three populations of heterogeneous agents, i.e. capital-good firms, consumption-good firms, consumers/workers, plus a bank and the Government (see Figure below). Capital-good firms invest in R&D and produce heterogeneous machine-tools, whose productivity evolves over time. Consumption-good firms combine machines bought from capital-good firms and labour in order to produce a homogeneous product for consumers. There is a minimal financial system represented by a single bank that provides finance to firms only, so they can borrow to produce and invest (and pay interest on it). Workers submit job applications to a random subset of firms, which hire according to expectations about goods demand. Note that the firm demand for labour is independent from the wage levels (alike an ensemble of fixed coefficient production functions). Consumption-good firms form adaptive expectation about future demand for product and decide thereafter their desired demand for labour. The government levies taxes on firms and pays unemployment benefits.

Figure 35: Schematic presentation of the K+S model



Source: Sant'Anna School of Advanced Studies

The capital- and consumption-good sectors. The capital-good industry is the locus where innovation is endogenously generated in the economy. Capital-good firms develop new machine-embodied techniques or imitate the ones of their competitors in order to produce and sell more productive and cheaper machinery, supplied on order to consumption-good firms. The capital-good market is characterised by imperfect information and Schumpeterian competition driven by technological innovation. Machine-tool firms signal the price and productivity of their machines to their existing customers as well to a subset of potential new ones and invest a fraction of past revenues in R&D in order to search for new machines or copy existing ones. On order, they produce machine-tools with labour only.

Prices are set using a fixed mark-up over unit costs of production. Consumption-good firms produce a homogeneous good employing capital (composed by different ``vintages'' of machines) and labour under constant returns to scale.

Desired production is determined according to adaptive demand expectations. Given the actual inventories, if the capital stock is not sufficient to produce the desired output, firms order new machines in order to expand their installed capacity, paying in advance -- drawing on their cash flows or, up to a limit proportional to its size, on bank credit. Moreover, they replace old machines according to a payback-period rule. As new machines embed state-of-the-art

technologies, the labour productivity of consumption-good firms increases over time according to the mix of vintages of machines present in their capital stocks. Consumption-good firms choose in every period their capital-good supplier comparing the price and the productivity of the machines they are aware of. Firms then fix their prices applying a variable mark-up rule on their production costs, trying to balance higher profits and the growth of market share. More specifically, mark-up dynamics is driven by the evolution of the latter: firms increase their price whenever their market share is expanding and vice versa. Imperfect information is also the normal state of the consumption-good market so consumers do not instantaneously switch to the most competitive producer. Market shares evolve according to a (quasi) replicator dynamics: more competitive firms expand while firms with relatively lower competitiveness levels shrink, or exit the market.

The labour market. We study two labour market regimes, which we call Fordist and Competitive. The two regimes capture alternative wage-labour nexus. Under the Fordist regime, wages are insensitive to the labour market conditions and indexed to the productivity gains of the firms. There is a sort of covenant between firms and workers concerning long-term employment: firms fire only when their profits get negative, while workers are loyal to employers and do not seek for alternative occupations. Labour market institutions contemplate a minimum wage fully indexed to aggregated economy productivity and unemployment benefits financed by taxes on profits. Conversely, in the Competitive regime, flexible wages respond to unemployment and market conditions, set by means of an asymmetric bargaining process between workers and firms, which have the last say. Employed workers search for better paid jobs with some positive probability and firms freely adjust (fire) their excess workforce according to their planned production. The competitive regime is also characterised by different labour institutions: minimum wage is only partially indexed to productivity and unemployment benefits -- and associated taxes on profits -- might or might not be there.

The labour-market K+S model has already proved to be able to generate jointly, as emergent properties, a wide set of stylized facts regarding both micro/meso phenomena and macro stylized facts. They include (i) endogenous growth; (ii) persistent fluctuations; (iii) recurrent involuntary unemployment; (iv) pro-cyclical consumption, investment, productivity, employment and changes in inventories; (v) fat-tailed distributions of aggregate growth rates; together with (persistent asymmetries in productivity across firms; (vi) spiky investment patterns; (vii) skewed firm size distributions; (viii) fat-tailed firm growth rates, and (ix) on the labour market side Beveridge, Wage (or Phillips), and Okun curves. To repeat, the foregoing robust statistical regularities and relatively stable relations amongst aggregate variables do indeed emerge out of turbulent, disequilibrium, microeconomic interactions. As such, the model can be used also as sort of 'laboratory' for policy experiments. We have begun to do it, showing, for example, the complementarity between Keynesian and Schumpeterian policies. Indeed, the policy analysis involves a fundamental paradigmatic change: the central concern for policies ought to shift away from efficient allocation issues, to the (imperfect) governance of coordination, and genuinely uncertain processes of change.

The model has also been extended beyond the structure described above to account for an energy sector that provides additional inputs to labour in the production process. Firms are fueled by heterogeneous “dirty” and “green” energy production plants, constitute the principal CO2 emission contributors. In addition, we model the link between CO2 concentrations in the atmosphere and the surface temperature through non-linear relationships and, as the temperature increases, stochastic damages affects both labour productivity and the stock of capital. In that, the model accounts both for frequent and mild environmental shocks and low-probability but extreme climate events.

Technical change occurs both in the manufacturing and energy side of the economy. Innovations and learning contribute to determine the cost of energy produced by differently carbon-intensive technologies, which, in turns, affect the energy-technology production mix and the total amount of CO2 emissions per unit of time. As aggregate demand increases over time, new energy plants are needed to fuel the production system. The decision about what type of plants to invest in depends upon the unitary costs of production stemming from different technologies. In general, renewable energy plants exhibit higher fixed capital and lower marginal costs with respect fossil fuel oriented plants. The process of technical change in the energy industry is also intimately linked to the dynamics of “green jobs”.

The model is modular and flexible. The climate box can be optionally activated or removed; relevantly, it allows us to analyse the economy's reaction to the dynamics of workers' productivity and health conditions as well as to policies affecting them. The energy sector and the enriched modelling of the production system grant evidence on the short- and long-run sustainability of various policy combinations. In addition, a large set of fiscal and industrial interventions can be introduced in the analysis.

The model can reproduce a large set of empirical stylized facts. For instance, GDP and energy demand grow at a similar rate. Emissions steadily grow as well, but less than the other two quantities. The dynamics of emissions resembles another feature observed in the data: they stagnate during strong recessions and rapidly accelerate immediately after. Models' simulations also mirror typical features of real data with respect to the volatility of output and its components. In line with the empirical literature, investment is more volatile than output, whereas consumption and another demand side component, energy demand, are less volatile. Unemployment rates seem to be quite stable across runs and average 12% in the Monte Carlo exercise, a result in relative accordance with actual data for different countries. Finally, the share of renewable energy in total energy production exhibits an average of 30% over the whole time span (2000-2010) and in only one period over three it finds above the threshold of 20%, indicating the nearly absent room for green transitions in a business as usual scenario. Again, the foregoing robust statistical regularities and relatively stable relations amongst aggregate variables do indeed emerge out of turbulent, disequilibrium, microeconomic interactions. The model can be conceived as a "laboratory" to test how policies affecting micro-level mechanisms impact the aggregate performances across various time scales (short, medium, long run).

Validation

The model produces time series data for a number of relevant variables, including macroeconomic aggregates and micro-level characteristics of the agents. Here is a brief list of the main ones:

Macro

- Output (GDP)
- Consumption
- Investments
- Unemployment rate
- Inflation rate
- Public Deficit
- Aggregate Debt
- Credit demand
- Average Productivity
- Average Energy Efficiency
- Wages

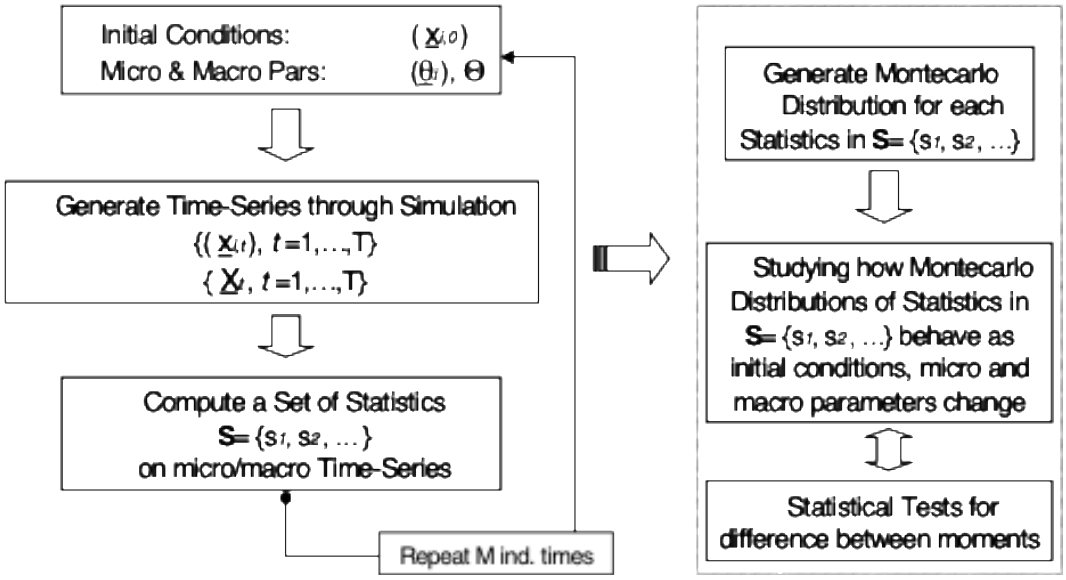
Micro

- Firms' productivity
- Firms' competitiveness
- Firms' Sales (Turnover)
- Firms' Employees
- Individual wages

The simulation protocol is simple and it is based on Monte Carlo exercises where we account for the intrinsic stochasticity of the model. The size of the Monte Carlo exercises we perform is variable but, in the majority of cases, it is equal to 100 or 150. From these exercises a series of statistics can be computed and compared to the corresponding ones coming from empirical data and from the empirical literature.

This procedure can be potentially repeated for different countries of groups of them. The following figure briefly illustrates this approach.

Figure 36: Analysis of simulation output



Source: Sant'Anna School of Advanced Studies

Sensitivity analysis. A number of sensitivity analyses are available for the model:

- **Kriging and Global Sensitivity Analysis**. These procedures allow us to infer the sensibility of a set of output variables to variations on models' parameters and initial conditions.
- **Machine Learning Surrogate Exploration**. This procedure allows us to learn an approximate and computationally efficient version of the true model, which is then used to explore its behaviour on possibly very large areas of the parameter space.
- **Generalised Subtracted L-divergence**. This procedure allows us to obtain a measure of the distance between the dynamical behaviour of the model for a different range of parameters and the corresponding one observed in the empirical data.

All the three procedures allow us to obtain Surface Plots which illustrate sensitivity of models' outcome to variations in parameters values for all possible scenarios.

Annex III – Details on method and sources for systematic review

Scientific literature

The scope of the systematic review was defined using the PICO method: Population, Intervention, Comparison, Outcomes. The population of the study is the EU. Interventions have been defined as social innovations initiatives in one of the six fields – Employment and training, Child care, Long-term care, Social Inclusion, Social Housing, Social Assistance - whereas Comparison is the absence of treatment/intervention. Outcomes differ, though they all relate to various components of (social) impact and its assessment. We broadened the scope to have a richer insight of the literature: for each of the six field, we have carried out two reviews - one targeting evaluations, the other targeting existing reviews or meta-analyses – in four electronic databases: IDEAS – RePEc (Research Papers in Economics), SSRN (Social Science Research Network), ISI Web of Science, and Scopus. The following table provides an overview of the data sources.

Table 8: Database overview

Source	Description
Scopus	Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books and conference proceedings. It delivers a comprehensive overview of the world's research output in the fields of science, technology, medicine, social sciences, and arts and humanities.
ISI Web of Science	ISI provides access to the world's leading citation database, with multidisciplinary information from over 12,000 high impact journals and over 160,000 conference proceedings from around the world.
IDEAS – RePEc (Research Papers in Economics)	IDEAS is the largest bibliographic database dedicated to Economics and available freely on the Internet. It includes over 1,700,000 items of research. About 1500 institutions contribute their bibliographic data directly to this database.
SSRN (Social Science Research Network)	SSRN a website devoted to the rapid dissemination of scholarly research in the social sciences and humanities. It facilitates the free posting and sharing of research material (e.g., conference papers, preprints, non-peer-reviewed papers) areas.

After several calibrations, 12 final search strings were developed using Boolean operators. Our overall framework for the search strings consists of three building blocks: Field, Domain, and Purpose. Compared to the provisional strings outlined in D1, a few improvements have been added. Under the previous strings, the vast majority of results consisted of studies on the social dynamics of the six fields (e.g. effect of unemployment on mortality), whereas the focus of the project lies rather in studies that assess initiatives in the six fields (e.g. impacts of a job-related scheme in an EU region). Therefore, we have added a third "Domain" building block, in addition to the "field-specific" block (employment vs. child care vs. social assistance…) and to the "purpose" block (meta-analyses vs. individual evaluations).

A second improvement relates to the Purpose building block. Unleashing the word "evaluation" in the search string ("evaluation" | "assessment" | "impact assessment"), as it was the case with the past strings, delivered an overwhelming number of results - in the case of employment 8,968 results had been obtained on the IDEAS database only, even by looking only at abstract. Instead, hooking evaluation to "impact" ("impact evaluation" | "impact assessment") gave a far more reasonable number – in the case of employment, 169 results with IDEAS, and 140 including the Domain block. We introduced several variations in the search strings to check how this modified our results, and to better adapt to the nature of individual databases. For example, SSRN does not allow for Boolean type of search, therefore we had to reiterate multiple simple strings and erase duplicates in an additional step. In IDEAS, it is not possible to search in titles and abstracts simultaneously. In WOS, we applied inclusion criteria to some of the 12 strings, considering only published articles written in English and no older than 2010.

Table 9: Systematic review - Search strings

#	Field	IDEAS	SCOPUS	WOS	SSRN
1	Employment (M)	(employment | unemployment | training) & ("meta analysis" | "systematic review") & (project | intervention | initiative | scheme | program | programme | policy | strategy)	(TITLE-ABS-KEY (employment OR unemployment) AND TITLE-ABS-KEY ("meta analysis" OR "systematic review") AND TITLE-ABS-KEY (project OR intervention OR initiative OR scheme OR program OR programme OR policy OR strategy)) AND SUBJAREA (mult OR ceng OR chem OR comp OR eart OR ener OR engi OR envi OR mate OR math OR phys OR mult OR arts OR busi OR deci OR econ OR psyc OR soci)	((TS=(employment OR unemployment) AND TS=("meta analysis" OR "systematic review")) AND TS=(((((((project OR intervention) OR initiative) OR scheme) OR program) OR programmed) OR policy) OR strategy))	employment "meta analysis" ; unemployment "meta analysis"; training "meta analysis"; employment "systematic review"; unemployment "systematic review"; training "systematic review"
2	Employment (E)	(employment | unemployment | training) & ("impact evaluation" | "impact assessment") & (project | intervention | initiative | scheme | program | programme | policy | strategy)	(TITLE-ABS-KEY (employment OR unemployment) AND TITLE-ABS-KEY ("impact evaluation" OR "impact assessment") AND TITLE-ABS-KEY (project OR intervention OR initiative OR scheme OR program OR programme OR policy OR strategy)) AND SUBJAREA (mult OR ceng OR chem OR comp OR eart OR ener OR engi OR envi OR mate OR math OR phys OR mult OR arts OR busi OR deci OR econ OR psyc OR soci)	((TS=(employment OR unemployment) AND TS=("impact evaluation" OR "impact assessment")) AND TS=(((((((project OR intervention) OR initiative) OR scheme) OR program) OR programmed) OR policy) OR strategy))	employment "impact evaluation"; unemployment "impact evaluation"; training "impact evaluation"; employment "impact assessment"; unemployment "impact assessment"; training "impact assessment"
3	Social Housing (M)	(“social housing”) & (“systematic review” | “meta analysis”)	(TITLE-ABS-KEY ("social housing") AND TITLE-ABS-KEY ("meta analysis" OR "systematic review"))	((TS=("social housing") AND TS=("meta analysis" OR "systematic review")))	"social housing" "meta analysis"; "social housing" "systematic review"; ; ; ;

4	Social Housing (E)	("social housing") & ("impact evaluation" | "impact assessment")	(TITLE-ABS-KEY ("social housing") AND TITLE-ABS-KEY ("impact evaluation" OR "impact assessment"))	((TS=("social housing") AND TS=("impact evaluation" OR "impact assessment")))	"social housing" "impact evaluation"; "social housing "impact assessment"; ; ; ;
5	Child Care(M)	("childcare" | child | children | youth) & (health | care) & ("meta analysis" | "systematic review") & (project | intervention | initiative | scheme | program | programme | policy | strategy)	(TITLE-ABS-KEY ("childcare" OR child OR children) AND TITLE-ABS-KEY (health OR care) AND TITLE ("meta analysis" OR "systematic review") AND TITLE-ABS-KEY (project OR intervention OR initiative OR scheme OR program OR programme OR policy OR strategy)) AND SUBJAREA (mult OR arts OR busi OR deci OR econ OR psyc OR soci) AND PUBYEAR > 2009	((((TS=("childcare" OR child OR children) AND TS=(health OR care) AND TS=("meta analysis" OR "systematic review")) AND TS=(((((((project OR intervention) OR initiative) OR scheme) OR program) OR programmed) OR policy) OR strategy))))	childcare "meta analysis"; child "meta analysis"; children "meta analysis"; youth "meta analysis"; childcare "systematic review"; child "systematic review"; children "systematic review"; youth "systematic review"
6	Child Care (E)	("childcare" | child | children | youth) & (health | care) & ("impact evaluation" | "impact assessment") & (project | intervention | initiative | scheme | program | programme | policy | strategy)	(TITLE-ABS-KEY ("childcare" OR child OR children OR youth) AND TITLE-ABS-KEY (health OR care) AND TITLE-ABS-KEY ("impact evaluation" OR "impact assessment") AND TITLE-ABS-KEY (project OR intervention OR initiative OR scheme OR program OR programme OR policy OR strategy)) AND SUBJAREA (mult OR arts OR busi OR deci OR econ OR psyc OR soci)	(((TS=("childcare" OR child OR children) AND TS=(health OR care) AND TS=("impact evaluation" OR "impact assessment")) AND TS=(((((((project OR intervention) OR initiative) OR scheme) OR program) OR programmed) OR policy) OR strategy)))	childcare "impact evaluation"; child "impact evaluation"; children "impact evaluation"; youth "impact evaluation"; childcare "impact assessment"; child "impact assessment"; children "impact assessment"; youth "impact assessment"

7	Long Term Care (M)	("long term care" | "long term services") & ("meta analysis" | "systematic review")	(TITLE-ABS-KEY ("long term care" OR "long term services") AND TITLE-ABS-KEY ("meta analysis" OR "systematic review")) (TITLE-ABS-KEY ("long term care") AND TITLE ("meta analysis" OR "systematic review") AND TITLE-ABS-KEY (project OR intervention OR initiative OR scheme OR program OR programme OR policy OR strategy)) AND SUBJAREA (mult OR arts OR busi OR deci OR econ OR psyc OR soci)	((((TS=("long term care") AND TS=("meta analysis" OR "systematic review"))) AND TS=(((((((project OR intervention) OR initiative) OR scheme) OR program) OR programmed) OR policy) OR strategy)))	"long term care" "meta analysis"; "long term care" "systematic review"
8	Long Term Care (E)	("long term care" | "long term services") & ("impact evaluation" | "impact assessment")	(TITLE-ABS-KEY ("long term care" OR "long term services") AND TITLE-ABS-KEY ("impact evaluation" OR "impact assessment"))	((TS=("long term care") AND TS=("impact evaluation" OR "impact assessment")))	"long term care" "impact evaluation"; "long term care "impact assessment"
9	Social Assistance (M)	("social assistance") & ("impact evaluation" | "impact assessment") & (project | intervention | initiative | scheme | program | programme | policy | strategy)	(TITLE-ABS-KEY ("social assistance") AND TITLE-ABS-KEY ("meta analysis" OR "systematic review") AND TITLE-ABS-KEY (project OR intervention OR initiative OR scheme OR program OR programme OR policy OR strategy))	((TS=("social assistance") AND TS=("meta analysis" OR "systematic review")) AND TS=(((((((project OR intervention) OR initiative) OR scheme) OR program) OR programmed) OR policy) OR strategy))	"social assistance" "systematic review"; "social assistance "meta analysis"

10	Social Assistance (E)	("social assistance") & ("meta analysis" | "systematic review") & (project | intervention | initiative | scheme | program | programme | policy | strategy)	(TITLE-ABS-KEY ("social assistance") AND TITLE-ABS-KEY ("impact evaluation" OR "impact assessment") AND TITLE-ABS-KEY (project OR intervention OR initiative OR scheme OR program OR programme OR policy OR strategy)) AND SUBJAREA (mult OR ceng OR chem OR comp OR eart OR ener OR engi OR envi OR mate OR math OR phys OR mult OR arts OR busi OR deci OR econ OR psyc OR soci)	((TS=("social assistance") AND TS=("impact assessment" OR "impact evaluation")) AND TS=(((((((project OR intervention) OR initiative) OR scheme) OR program) OR programmed) OR policy) OR strategy))	"social assistance" "impact evaluation"; "social assistance" "impact assessment"
11	Social Inclusion (M)	("social inclusion") & ("systematic review" | "meta analysis")	(TITLE-ABS-KEY ("social inclusion") AND TITLE-ABS-KEY ("meta analysis" OR "systematic review")) AND SUBJAREA (mult OR ceng OR chem OR comp OR eart OR ener OR engi OR envi OR mate OR math OR phys OR mult OR arts OR busi OR deci OR econ OR psyc OR soci)	((TS=("social inclusion") AND TS=("meta analysis" OR "systematic review")))	"social inclusion" "meta analysis"; "social inclusion" "systematic review"
12	Social Inclusion (E)	("social inclusion") & ("impact evaluation" | "impact assessment")	(TITLE-ABS-KEY ("social inclusion") AND TITLE-ABS-KEY ("impact evaluation" OR "impact assessment")) AND SUBJAREA (mult OR ceng OR chem OR comp OR eart OR ener OR engi OR envi OR mate OR math OR phys OR mult OR arts OR busi OR deci OR econ OR psyc OR soci)	((TS=("social inclusion") AND TS=("impact evaluation" OR "impact assessment")))	"social inclusion" "impact evaluation"; "social inclusion" "impact assessment"

Source: Authors' elaboration. Note: (M) = Meta-analysis; (E) = Evaluation.

Using these criteria and the search strings, we conducted the search in November 2016 on each database and for each string. After the search, results were downloaded and aggregated in a consolidated database. The search produced a total of 2,813 results across the 12 strings. After checking for within-database duplicates, the total number decreased to 2,737 results. After checking for across-database duplicates, the total number decreased to 2,400 results. Then, an in-depth content screening was carried out. As a result, the final selection consists of a total of 219 results, of which 155 meta-analyses and 64 evaluations.

Table 10: Systematic review – full results

#	Field	IDEAS	SCOPUS	WOS	SSRN (1)	SSRN (2)	Total (1)	Total (2)	Total (3)	Final
1	Employment (M)	60	179	77	96	65	412	381	315	47
2	Employment (E)	140	254	77	88	71	559	542	440	21
3	Social Housing (M)	10	5	3	0	0	18	18	14	2
4	Social Housing (E)	0	6	4	6	6	16	16	9	2
5	Child Care (M)	32	345	687	37	25	1,101	1,089	1,026	86
6	Child Care (E)	33	142	135	76	60	386	370	323	26
7	Long Term Care (M)	3	39	44	0	0	86	86	79	12
8	Long Term Care (E)	0	31	11	0	0	42	42	28	10
9	Social Assistance (M)	6	6	3	1	1	16	16	14	3
10	Social Assistance (E)	1	3	2	0	0	6	6	4	1
11	Social Inclusion (M)	21	15	20	0	0	56	56	51	5
12	Social Inclusion (E)	89	14	12	0	0	115	115	97	4
	Total						2,813	2,737	2,400	219

Source: Authors' elaboration. Note: (M) = Meta-analysis; (E) = Evaluation. "SSRN (1)" includes within-database duplicates. "Total (1)" includes other within-database duplicates. "Total (2)" includes across-database duplicates.

Policy-based grey literature

Social innovation is addressed more or less directly in many policy areas that form the Europe 2020 strategy. The most important development has been the launch in 2013 of the **Social Investment Package (SIP)** (European Commission, 2013). The SIP contains the idea and ambition that a number of social policies can have an investment character and produce returns in terms of human capital development and of promoting higher employment and output levels. The SIP urges Member States to prioritise social investment and the modernisation of their welfare systems in order to address unemployment, poverty, social exclusion, and sustainability challenges brought about by the economic crisis and the ageing population trends. It stresses that national welfare systems should aim at stabilising the economy, and at promoting social protection and social investment. Social investment is human capital investment, or any set of policies that strengthen people's current and future capacity to participate in the labour market and in the social and economic life. In this respect SIP aimed at improving protection for EU Citizens also by stimulating re-calibration and strategic institutional innovation.

Welfare recalibration has proceeded slowly in recent years, with emergency measures responding to the crisis taking precedence over a systematic and strategic modernisation with long-term perspective. Member States are encouraged to pursue active policies to prioritise social investment and modernise their welfare systems: spending more effectively and efficiently to ensure adequate and sustainable social protection; investing in people's skills to improve opportunities to integrate society and the labour market; ensuring social protection systems respond to people's needs at critical moments during their lives. It is worth stressing, especially with respect to the objectives of the IESI project in general and of iFrame 2.0[43] in particular, that the SIP underscores the added value in focusing on innovative social policies and embedding innovation in evidence-based policy-making.

Of the seven **Europe 2020 flagship initiatives**, two deal with social innovation directly – although all seven are related to a certain extent (BEPA, 2014). These are Innovation Union and the European Platform against Poverty and Social Exclusion. The Innovation Union is the EU strategy to create an innovation-friendly environment in Europe. Built around 34 specific commitments, it consists of a bold, integrated and strategic approach to innovation combining various policies, tool and levels of intervention – Member States and EU – to improve framework conditions and access to finance for research and innovation, so that innovative ideas can translate into products and services and create growth and jobs. The Innovation Union states that "Social innovation is an important new field which should be nurtured". It also states that "As well as meeting social needs and tackling societal challenges, social innovations empower people and create new social relationships and models of collaboration", and that "while there is no shortage of good ideas, social innovations are not yet producing the impact that they should".

The main objective of the **European Platform against Poverty and Social Exclusion** is to help Member States to ensure cohesion in social, economic and territorial terms. Social innovation is a means to address poverty dynamics, to help recognising specific expertise of people experiencing poverty and to facilitate a partnership between civil society, social partners, and Member States. The initiative consists of five areas for action, two of which relate directly to social innovation: "promoting evidence-based policy innovation" and "promoting a partnership approach to the social economy". With regards to policy aimed at deepening and consolidating the Single Market, the **Single Market Act I** defined twelve priorities to re-launch Europe's growth and social progress. The eighth priority encourages new emerging business models where "social, ethical or environmental objectives" are pursued alongside financial profit. The Social Business Initiative (SBI) aims to create a favourable environment for the development of social business in Europe; and the Single Market Act II foresees a methodology to measure the socio-economic benefits created by social enterprises.

In the pillars of the **Youth on the Move initiative** - reduce early school leaving, modernise higher education, encourage mobility and youth employment - social innovation is highlighted, firstly by committing to young people's participation in the design of policy measures, and

43 See IESI - ICT-Enabled Social Innovation to support the implementation of the Social Investment Package at for a detailed description of the previous work conducted by the JRC. https://ec.europa.eu/jrc/en/iesi

secondly by encouraging universities to improve the quality of their courses by making them more responsive to student's needs. Youth unemployment is also tackled through more learning experiences and more possibilities for self-employment. With regards to energy and environmental law, regulations such as the **Energy Efficiency Directive** (art 7 par 7, art 12, art 5 par 7, art 9) and the **Eco-design Directive** (art 3) relate to social innovation, whereas the Citizen Energy Forum's Vulnerable Consumers Working Group includes it in its recommendations. Finally, the effort[44] to design proper indicators to monitor improvements in the use of resources represents another relevant uptake of social innovation.

Programme and project based sources

The **EASI programme** (2014-2020) builds on its predecessor **PROGRESS** (2007-2013) and includes a dedicated budget to test social policy innovation, including: design, evaluation and larger-scale implementation of new social policy initiatives in line with the SIP approach; exploring the role of PPPs in welfare reforms and investment in human capital; award schemes for social entrepreneurs; social policy experimentation in support of SIP actions, such as 'housing first', 'one-stop-shops' and 'work in stations' projects.

The **Horizon 2020 programme** links research with innovation. The take-up of social innovation here is across all themes. Social innovation projects in FP7 include CRESSI[45] (Creating Economic Space for Social Innovation); EFESEIIS[46] (Enabling the flourishing and evolution of social entrepreneurship for innovative and inclusive societies); ImPRovE[47] (Poverty Reduction in Europe: Social policy and innovation); ITSSOIN[48] (Social Innovation and Civic Engagement); SEFORIS[49] (Social Enterprise as Force for more Inclusive and Innovative Societies); SI-DRIVE[50] (Social Innovation: Driving Force of Social Change); SIMPACT[51] (Boosting the Impact of Social Innovation in Europe through Economic Underpinnings); SocIEtY[52] (Social Innovation - Empowering the Young for the Common Good); TEPSIE[53] (Theoretical, Empirical and Policy Foundations for Social Innovation in Europe); Third Sector Impact[54] (The Contribution of the Third Sector to Europe's Socio-economic Development); TRANSIT[55] (Transformative Social Innovation Theory).

Under the EU Cohesion Policy, the **European Social Fund (ESF)** and the **European Regional Development Fund (ERDF)** support social innovation in a number of ways. Social innovation is a tool to improve the employment, social inclusion, education and institutional capacity-building policies supported by the ESF. The ERDF can contribute to the development of social enterprises by promoting new business models and innovative solutions to address societal challenges. The ERDF will also be able to support ICT development by supporting product development and by strengthening the use of existing applications in eHealth, eLearning and eInclusion. Other programmes where social innovation could be funded include COSME, Erasmus for Young Entrepreneurs, Erasmus+, Creative Europe, and the Eco-Innovation Action Plan.

With regards to **one-off EU initiatives and projects**, a distinction can help between interventions directed to EU policymakers, and to social innovators. The former includes: events, such as workshops, conventions, and open days, to facilitate coordination among actors; guidance, provided by studies and analyses such as the Guide to Social Innovation, to help officers to programme social innovations in ESIF; or the Social Experimentation guide, to help testing interventions on a small population so as to evaluate its efficiency before deciding to scale it up; new policy instruments, such as expert groups and EIPs; and regulatory

44 http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/resource-efficiency-indicators
45 CRESSI. http://www.sbs.ox.ac.uk/faculty-research/research-projects/creating-economic-space-social-innovation-cressi
46 EFESEIIS. Available at http://www.fp7-efeseiis.eu/ (retrieved 31 January 2017).
47 IMPROVE. Available at http://improve-research.eu/ (retrieved 31 January 2017).
48 ITSSOIN. Available at http://itssoin.eu/ (retrieved 31 January 2017).
49 SEFORIS. Available at http://www.seforis.eu/ (retrieved 31 January 2017).
50 SI-DRIVE. Available at https://www.si-drive.eu/ (retrieved 31 January 2017).
51 SIMPACT. Available at http://www.simpact-project.eu/ (retrieved 31 January 2017).
52 SociETY. Available at http://www.society-youth.eu/ (retrieved 31 January 2017).
53 TEPSIE. Available at http://www.tepsie.eu/ (retrieved 31 January 2017).
54 Third Sector Impact. Available at http://thirdsectorimpact.eu/ (retrieved 31 January 2017).
55 TRANSIT. Available at http://www.transitsocialinnovation.eu/ (retrieved 31 January 2017).

initiatives. With regard to the second category, the starting point is the large 2014 EU-wide study "A mapping of the social enterprises and their ecosystems in Europe"[56].

Other initiatives for social innovators include: platforms and communities, such as Social Innovation Community[57]; Digital Social Innovation[58]; Collective Awareness Platforms for Sustainability and Social Innovation (CAPS)[59]; European Workplace Innovation Network; Sharing Experience Europe – Policy Innovation Design[60]; networks for incubators, such as BENISI[61], and TRANSITION[62]; and awards, such as the European Social Innovation Competition[63] by DG GROW, The Social Innovation Tournament[64] by the EIB, and RegioStars Awards[65] by DG REGIO.

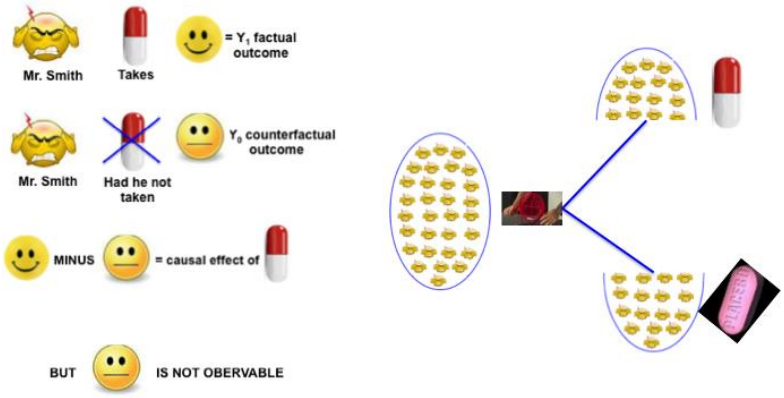
56 Social enterprises_ report, DG EMPL, http://ec.europa.eu/social/main.jsp?langId=it&catId=89&newsId=2149.
57 Social Innovation Community. Available at: https://www.siceurope.eu/about-sic (retrieved 31 January 2017).
58 Digital Social Innovation. Available at https://digitalsocial.eu/ (retrieved 31 January 2017).
59 Collective Awareness Platforms for Sustainability and Social Innovation (CAPS). Available at https://ec.europa.eu/digital-single-market/en/collective-awareness (retrieved 31 January 2017).
60 Sharing Experience Europe, Policy Innovation Design. http://www.seeplatform.eu/ (retrieved 31 January 2017).
61 BENISI. Available at http://www.benisi.eu/ (retrieved 31 January 2017).
62 TRANSITION. Available at http://transitionproject.eu/ (retrieved 31 January 2017).
63 European Social Innovation Competition. Availble at https://ec.europa.eu/growth/industry/innovation/policy/social/competition_en (retrieved 31 January 2017).
64 The Social Innovation Tournament. Available at http://institute.eib.org/whatwedo/social/social-innovation-tournament/ (retrieved 31 January 2017).
65 RegioStars Awards. Availble at http://ec.europa.eu/regional_policy/en/regio-stars-awards/ (retrieved 31 January 2017).

Annex IV – On experiments and their validity

Random Assignment

The use of randomised experiments is widely considered as the gold standard for recovering unbiased estimates of causal parameters[66]. Below we illustrate both intuitively and in formalised fashion how the counterfactual logic of causation works. As we discuss in further details in in next paragraph, experiments overall validity depends on several dimensions (internal validity, ecological validity, external validity, construct validity), it varies depending on how the experiment is realised (laboratory/online vs. field experiments), as well as on specific design choices (i.e., between-subjects vs. within-subjects; main effect, fractional, and full factorial design). For the moment let us start from a hypothetical between-subject design without further specification of the context (lab vs. field) and of other design aspects; and let us consider only internal validity defined as the extent to which the experiment warrants a causal conclusion regarding the effect of D (treatment) on Y (outcome). The key challenges for internal validity that may undermine the capacity to discern causation from correlation are the 'selection bias' and 'unobservable' variables (from which springs the endogeneity problem). Imagine the classical Mr Smith has a headache and takes the aspirin (see figure below).

Figure 37: Counterfactual causation



Source: Open Evidence

Once he does take the aspirin we can no longer observe what would have happened had he not taken it. Lacking this information, we cannot solve the simple operation Y1-Y0 (Smith's health taking and not taking the aspirin); the observed difference in the health status of Smith does not give us the causal effect.

Let us now reason in terms of a research question that may be typical of social policy context. For instance, let us consider a treatment D in the form of a training programme for Long Term Unemployed (LTU) whose desirable outcome is that the treated find a job.

Let us add that, we are not considering an experiment but rather an hypothetical real world situation where the chances that different units in the population of LTU are exposed to the information that this training for finding employment is available and that being aware decide to participate depend on their individual level characteristics (i.e., educational level, age, digital skills, etc.).

We can proceed to discuss this situation and the logic underlying randomisation in formalised fashion. The logic underlying Randomised experiments is often explicated in terms of a notational system that has its origins in Neyman (1923) and Rubin (1974) and that we present below in summarised and simplified version. In a way what follows is what in econometrics is called the problem of identification[67].

66 Although this is changing and some have argued it is a 'bronze standard' unless they are carried out strictly according to all the precepts, including double blinded randomisation (Berk, 2005).

67 As Manski explains (1995, 2003), econometricians distinguish between the identification and estimation of causal relationships. Estimation problems have to do with statistical issues of whether, given the data set analysed and the assumptions made about the relationship between the data set and the population, the parameters of interest are efficiently and consistently estimated, or statistical validity. Manski remarks (2003, p. 12): "Statistical inference seeks to characterize how sampling variability affects the conclusions that can be drawn from samples of

The formalised notation is as follows:

- We have observation on N units indexed by i= 1,…, N;
- We use the binary indicator Di to indicate whether the unit i was treated or not treated is a dummy variable with: Di=0 if unit i is not 'treated' (did not attend training course), and Di=1 if unit i is treated (attended the training course);
- Yi is the observed outcome (found or not a job sometime after the training is finished) for each population unit i;
- Yi= Y1i if Di=1 (unit i is treated);
- Yi= Y0i if Di= 0 (unit i is not treated);
- Let (Y1, Y0)i be the two outcomes corresponding to the i-th population unit being treated or not treated, respectively
- Y1i- Y0i= unit level causal effect;
- Y0i= is the counterfactual for an individual who took the course;
- Y1i= is the counterfactual for an individual who did not take the course.

	Factual Outcome	Counterfactual Outcome
Treated (D=1)	Y1	Y0
Non-Treated (D=0)	Y0	Y1

If a specific member of the population is exposed to the intervention then Y1 is observable, while Y0 is irreversibly unobservable on that specific member. Il follows that Y1 and Y0 are the factual and observable outcomes for treated and non-treated respectively. The counterfactual outcome for a member of the population who was treated is Y0 and for one who was not treated is Y1. Henceforth we simplify the notation abandoning the index i and simply using the suffix 1 or 0 but with the important notation that blue refers to factual outcomes and red to counterfactual ones as per the summary table above.

Now let us proceed illustrating the standard logic identity focusing on the average treatment effect on the treated[68].

Average Treatment on the Treated (ATT) = E {Y1 – Y0 | D= 1} = E {Y1 | D= 1} – E {Y0 | D= 1};

Evidently the second term of the identity is unknown and unobservable as it represents the counterfactual for the treated; it means whether a hypothetical subject who attended the course would have found a job or not, had he/she not attended the course; even more concretely if we have Marc attending the course and finding a job, then the second term means would have Marc found a job had he not taken the course?

Let us now consider the term E {(Y1 | D= 1) – E {Y0 | D= 0}, which represents the factually observed difference in means between treated and non-treated that is observed and known; then we add and subtract to it the term E {Y0 | D= 1}, that is the counterfactual for the non-treated (Laura did not attend the course, what would her employment status has she taken the course? Again this is unknown and unobservable).

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limited size." In contrast, an identification problem exists when it is problematic to establish causal inferences even if the researcher has an unlimited sample from the population. In the logical notation of identification one considers the possibility of recovering a causal parameter in abstract but under the hypothesis of no limitation in data. In this respect the econometric concept of identification is analogous to one of the three dimensions into which the internal validity of experimental research can be broken down that is , as we shall see in § 2.2, 'causal validity'.

68 This is the causal effect of major interest from a policy perspective; the other important effect is the Average Treatment Effect (ATE) defined as E {Y1 – Y0} or the average effect that would result from having all population members (or none at all) take part in the programme. ATE perhaps is not a crucial parameter of interest for impact evaluation. It is the most relevant parameter when the programme under consideration is universal, in the sense that it would expose all units of the target-population to treatment.

We, thus, get: E {(Y1 | D= 1) – E {Y0 | D= 0} = [E {Y1 I D = 1} – E {Y0 I D = 1}] + [{E {Y0 I D = 1} – E {Y0 | D= 0}]; in word (following the notation of using bold, underline, and italic) this means that **Observed Means Differences**= Average Treatment on the Treated (ATT)+ Selection Bias. So, the ATT and the selection bias cannot be disentangled and simply calculating the difference in observed means will not suffice to identify the causal effect of the treatment on the treated. The selection bias term of the identity, [{E {Y0 I D = 1} – E {Y0 | D= 0}}, can be easily interpreted as the difference in the outcome Y that would be observed between treated and non-treated if there was no treatment, and depends on pre-existing differences between the two groups. That is, this term captures outcome differences between treated and non-treated that cannot be attributed to the treatment. The first term of the selection bias is not observable. So, unless the selection bias is equal to zero or we can in some way control it (i.e., measure it), the full identity above cannot be given a causal interpretation. The selection bias is a function of X characteristics (possibly unobserved) of the treated and non-treated subjects. In other words, we are saying that a vector of Xs variables shapes the values of the variable D, or how the groups D=0 and D=1 are formed. With some additional equations we spare the readers, we can show that X is correlated to Y and hence the selection bias does not vanish, since the two groups (treated and non-treated) are not equivalent with regard to Xs. In other words, there is a selection bias when: a) being treated or not depend on individual characteristics X known to affect also the outcome variable; and b) such characteristics are unequally distributed between treated and non-treated.

Under the condition of a randomised experiment the selection bias vanish and then we can basically recover the causal effect as a simple difference in means (see infra for a regression based illustration of this). Under randomisation the dummy variable D is a toss of a coin and is not systematically related to either Y or Xs in anyway, hence the selection bias of the previous identity entirely vanishes (equal to zero). In concrete, if we randomise subjects to either take or not the course, their unobserved characteristics would no longer be related to their employment status sometime after the course is ended. Well-performed randomisation ensures that the treated and non-treated groups are balanced with respect to these unobserved characteristics.

Under the condition of randomization, thus, the treatment effect is estimated as a difference between two means. Econometrically, such difference in mean can be obtained (if it exists) running a regression analysis where dependent variable is our outcome Y and the independent variable is a dummy equal to one if the subject took the course and zero otherwise. Let "y" be, for instance, "employment status after a time lag T" measured with respect to whether subjects took (D=1) or not (D=0) the course. Hence, the general formula for the y is:

$y=a + b\ D1 + \varepsilon$

The term ε includes all the observable and unobservable variables that impact on Y. What is important is that under randomization the expected value of ε under treatment (in technical notation E[ε| D1]) is equal to zero (orthogonality condition). A simple Ordinary Least Square (OLS) regression is capable of identifying "b", since the exogeneity condition is met. The coefficient "b" is precisely the treatment effect. In fact, for those that did not receive the treatment the expected value for y is:

$E[y \mid D1=0] = y0 = a$

While for the treated group we have:

$E[y \mid D1=1]= y1 = a + b$

So, by definition:

$b = y1 – y0$

This corresponds to the difference in the mean outcome between treated and untreated group, i.e. the treatment effect. The coefficient "b" is also what we can consistently estimate with Ordinary Least Square (OLS).

Validity

Some level of ambiguity and confusion surrounds the validity of experimental research since different dimensions (internal, external, ecological) and, especially, different definitions of such dimensions are used. This springs particularly by the different norms and practices in different fields and especially in the distinct traditions of psychology and economics. In this paragraph we mostly use classic sources to establish the baseline that will inspire our approach to the design of behavioural experiments. To start with we can take the essence of the validity of empirical research from a question formulated in the classic work of Shadish, Cook, and Campbell (2002) and the answer they provide; the question is 'what one can believe about what one learns from the data? The answer to this question is given by the overall validity of the experiment generating such data that can be defined as the 'approximate truth' of the inference or knowledge claim made on the basis of such data. This is an intuitive question given the discussion about how randomisation enables to recover unbiased estimates of causal relationships. Random assignment enables the researcher to formulate the appropriate comparisons, but random assignment alone does not ensure that the comparison will speak convincingly to the original causal question.

A randomised experiment obviously presents an ideal opportunity for having: a) the Data Generating Process (DGP) of the variable of intervention subject to exogenous variation; b) the participants to the study representative of the population object of the intervention; and if our in a laboratory context c) the behaviour measured in the lab (on average) identical to the variable of interests that we want to study with respect to our theory and/or the underlying real environment phenomenon of interest. The main strategic challenge is that experiments may remain a very 'local' type of evidence and this is problematic if our goal is to support policymakers who are interest in general results. As matter of facts all of the literature on experimental validity and on internal and external validity originated in the theory Campbell and his associates developed on how to move from 'local' evidence to 'generalisation'. The problem was framed as one of extension to other populations and settings (external validity) and of representation and measurement (construct validity). As noted (McGraw and Hoekstra, 1994; Shadish, et al., 2002), in this effort Campbell early on abandoned the single binary distinction between internal and external validity; first Cook and Campbell extended the notion of internal validity (1979) and later with Shadish, Cook, and Campbell (2002), incorporating clarifications advanced by Cronbach with his UTOS (Units, Treatments, Observation operations, Settings) framework (1982), validity was divided into four concepts: causal validity, construct validity, statistical validity, and external validity. Ecological validity, as we shall see it partially overlap with construct validity and with external validity, although it has its own distinct tradition in psychology starting with Brunswik's suggestion that we should study the participant's setting (1943), and then being further developed particularly from an ecological perspective.

If validity in general is the 'approximate truth the inference or knowledge claim', then **internal validity** is the approximate truth the inference or knowledge claim made with respect to a target population studied. Following the same general definition then external validity would be the approximate truth of the inference or knowledge claim for observations beyond the target population studied.

Campbell (1957) considered an experiment internally valid if the experimenter finds a significant difference between the treatment and control conditions. These differences are then assumed to provide a meaningful reflection of the causal processes at play. As long as no reason exists to assume that some extraneous mediating factor systematically influenced subjects' responses, observers can attribute changes in the dependent variable to systematic manipulations across the independent variables. From this perspective, internal validity is enhanced by experiments that are well designed, carefully controlled, and meticulously measured so that alternative explanations for the phenomena under consideration can be excluded. Shadish, Cook, and Campbell (2002) are careful to note that internally valid findings remain discrete to the specific experimental context in which they are explored. As anticipated, Campbell and associates divided internal validity into three separate concepts: causal validity, construct validity, statistical validity.

Causal validity. Causal validity is the determination of whether the relationships the researcher finds within the target population analysed are causal; to some extent it corresponds to the identification problem in econometrics that we mentioned earlier when we illustrated the formal logic behind randomisation. Establishing causal validity for the relationship between X and Y would mean establishing that changes in X causes changes in Y. Very often this is what analysts have in mind when they consider internal validity, whereas establishing a causal relation does not exhaust the criteria for assessing the internal validity of an experiment, if we recall that the goals are those of extension from local to general knowledge and of representation. We can possibly demonstrate that X causes variations in Y and that there are no other factor influencing them and yet score poorly in internal validity if the inferences we draw are flawed, for instance, by the fact that the variables we measured do not represent well the variable in the theory or in the real world, which smoothly leads us to consider the next dimension of construct validity.

Construct validity. First and foremost construct validity has to do with how valid the inferences of the data are for the theory (or constructs) the researcher is evaluating. In experimental research the question is whether the design of the experiment is such that the variables investigated are closely equivalent to the variables the theory is concerned with. Are those things that the theory holds constant held constant in the experiment? Are the choices before the subjects the same as the choices assumed in the theory? In other words, is there a close match between what the theory (the real world) is about and what is happening in the manipulated Data Generating Process? As the theory can be assumed to deal with what happens in the real world, then the above sentences can be to some extent be rephrased in terms of the adherence between the experiment and what happen in practice, for instance: are the choice before the subjects the same (or similar enough) as the choice they face in the real world? In this respect construct validity and ecological validity overlaps and the former is not immune from consideration on the trade-off between 'mundane' and 'experimental' realism. So, although construct validity is a dimension of internal validity, construct validity is also about generalization and reflect the attempt to move from the local to the general by way of ensuring valid representation. Results from experiments with high construct validity can help us answer more general questions than those without construct validity.

Statistical validity. In simple terms statistical validity depends on the significance of the statistical relation estimated for the variables of interest and on the size of such relation. Given the assumption made and other aspects of the design and of the Data Generating Process, one must ask whether estimates are efficient, accurate, significant, and sizable, and also whether the data set is representative of the target population. Usually other aspects of validity are considered more challenging and given more attention than statistical validity, as the latter is so to speak 'commoditized' given the increasing capacities of statistical software packages. Yet, there are questions that statistical packages do not solve and on which the research must reflect. What are in general the implications of different level of statistical significance? What if we find a relationship that is just on the edge of the 5% level? Also important is the extent to which the assumptions about variables distribution are supported and whether or not errors are correctly estimated.

Mundane versus experimental realism. As argued (Aronson et al., 1990), despite efforts internal validity remains intrinsically tied to experimental, as opposed to mundane, realism. Those who are sceptical about the experimental method often point to the artificial nature of laboratory settings as a main weakness and obstacle to generalisation. The critique holds that the tasks presented to subjects offer a poor analogue to the real-world experiences that individuals confront. Strong proponents of the experimental method, especially in experimental economics game-theoretic experiment but also to some extent in psychology argue on the contrary that stylized and stripped down settings are needed to carefully operationalise and measure the variables of interest and then, through multiple tests on numerous populations, to begin to define the conditions under which generality might obtain. The reason it becomes so critical to uncover these mechanisms is because unless an investigator knows the underlying principles operating in a given dynamic, it will prove simply impossible to ascertain which aspect of behaviour is causing which effect within the context of real-world settings where many other variables and interactions occur simultaneously.

In this tradition it does not matter whether the experimental environment does not overtly mimic the real-world setting as long as the subject experiences the relevant forces that the investigator seeks to elicit. A more balanced view is to recognise that if experimental subjects become psychologically disengaged in the process they confront and do not pay attention in performing the tasks this clearly undermines internal validity and the possibility to extent the findings. If subjects approach a task with scepticism or detachment, then genuine responses fade and strategic incentives come to the fore. This raises the possibility that measures obtained do not accurately reflect the process being manipulated, but rather manifest a different underlying construct altogether. This is a clear threat to construct validity. Hence, the motivation of the subjects and the internal experience of the experiment for them should ensure engagement and for this to occur the settings need not necessarily reflect outside appearances.

The success of the experiment depends on the subject taking the task seriously, and experimenters can foster such engagement to the degree that they can create and establish a situation that forces psychological investment on the part of subjects. The critical operative feature in such experimental designs revolves around the ability of the experimenter to create a psychological situation that realistically elicits the dynamics under consideration. So, experimental realism remains more important than mundane realism in maximising prospects for internal validity because it is more likely to elicit the critical dynamic under investigation; but more highly stylized or abstract experimental protocols can risk both internal and external validity by failing to engage subjects' attention or interest.

External validity refers to the generalizability of findings from a study, or the extent to which conclusions can be applied across different populations or situations; too often, however, external validity is simply intended as a matter of representativeness or of the size of the sample. Privileging of external validity often results from a misunderstanding that generalizability can result from single study as long as it is large enough or broad enough; this is never true. External validity results primarily and eventually from replication of particular experiments across diverse populations and different settings, using a variety of methods and measures.

As put it by Aronson et al. 'No matter how similar or dissimilar the experimental context is to a real-life situation, it is still only one context: we cannot know how far the results will generalise to other contexts unless we carry on an integrated programme of systematic replication' (1990, p. 77). External validity is the extent to which the 'causal relationship holds over variations in persons, settings, treatments, and outcomes' (Shadish, Cook, and Campbell, 2002, p. 83).

Hence, it covers four aspects of experimental design:

1) whether the participants resemble the actors who are ordinarily confronted with these stimuli;

2) whether the context (including the time) within which actors operate resembles the context (and time) of interest;

3) whether the stimulus used in the study resembles the stimulus of interest in the world; and

4) whether the outcome measures resemble the actual outcomes of theoretical or practical interest.

So, the challenge for external validity is to extend to other subjects (i.e. representativeness strictu sensu), other observations, other treatments, and other settings as in the Units Treatments, Observing operations, Settings (UTOS) framework articulated by Cronbach (1982) for establishing valid causal inference.

Finally, it is worth pointing out that often when critics say that an experiment does not have external validity they just have in mind that the sample used (in laboratory) is not randomly drawn; yet, this has to do with internal statistical validity and not with external validity. Random sampling from a target population does not necessarily mean that a result is externally valid. External validity has to do with generalizing to populations beyond the target population, so whether one has a random sample from the target population tells nothing about the external validity for other populations for which one has not taken a random sample.

As a starting point **ecological validity** can be seen as referring to the relation between real-world phenomena and the investigation of these phenomena in experimental contexts. Yet, as for other dimension of validity there are many different definitions (Scheidt, 1981, pp. 225-226). The focus on ecological validity started with Brunswik's (1943) suggestion to study the participant's setting. It then continued with Bronfenbrenner's (1977) echoing of the same emphasis and with Neisser (1976) arguing that the stimulus materials should be ecologically valid; this was also the concern of Gibson's ecological psychology and in particular on the perceptual dimension of stimuli (1979).

In brief, ecological validity concerns focussed on the realism of three aspects:

a) the settings;

b) the stimuli; and

c) the responses.

Ecological validity involves maintaining the integrity of the real-life situation in the experimental context while remaining faithful to the larger social and cultural context. More intuitively ecological validity is similar to what Harrison and List (2004) refer to as the 'fieldness' of an experiment.

Ecological validity is a dimension that could be considered as a subset of both external validity and of construct validity. If we consider it in terms of settings (the S in Cronbach's UTOS framework, see infra in this glossary) then obviously ecological validity is sub-dimension of external validity.

On the other hand, if we look at ecological validity as concerning the problems that may arise from the interaction between the aseptic (artificial) context typical of a laboratory experiment and the behaviour of subjects, which means the interaction between the design and the measurement of the variable of interest, then lack of ecological validity can actually be seen as a problem of construct validity inasmuch as the measurement generated may not validly measure the underlying construct (phenomenon) due for instance to subjects disengagement with the experimental task. It is about the similarity between the environment constructed in the research and a target environment. Some experimentalists call this mundane experimental realism or contextual congruence. The experimental environment is considered ecologically valid if the methods, materials, and settings of the research are similar to the target environment.

It must be clarified, however, that maximising ecological validity may or may not enhance external validity of the results because the target environment may not generalise. External validity can be conjectured or hypothesized based on similar studies or assumptions about population similarities about any study, experimental or non-experimental, but the proof of external validity is always empirical.

In conclusion, generalising from RCTs, being field experiments or laboratory experiments, is a very difficult undertaking that requires theory accumulation and experiments replicability.

As put it by Aronson et al.: "Bringing the research out of the laboratory does not necessarily make it more generalizable or "true"; it simply makes it different. The question of which method – "artificial" laboratory experiments versus experiments conducted in the real world – will provide the more generalizable results is simply the wrong question. The generalizability of any research finding is limited.

This limitation can be explicated only by systematically testing the robustness of research results across different empirical realizations of both the independent and dependent variables via systematic replication to test the extent to which different translations of abstract concepts into concrete realizations yield similar results" (1990, 82).

Annex V - Synoptic summary of scientific literature review

Table 11: Systematic review – Employment

Active labour market programs (ALMP) in general, vocational training programmes, job search intervention		
Authors	**Geographical coverage**	**Summary**
Greenberg, D. H., Michalopoulos, C., & Robins, P. K. (2003)	U.S.	The earnings effects of the programmes evaluated in the article seem to have been largest for women, quite modest for men, and negligible for youths. For men and women, the earnings effects of training appear to have persisted for at least several years after the training was complete.
Card, D., Kluve, J., & Weber, A. (2010)	OECD countries	Job search assistance programmes yield relatively favourable programme impacts, whereas public sector employment programmes are less effective. Training programmes are associated with positive medium-term impacts, although in the short term they often appear ineffective.
Greenberg, D., & Cebulla, A. (2008).	U.S.	Costs of a typical welfare-to-work programme probably exceeded its benefits from the perspective of the government, but those assigned to the programme, and possibly society as a whole, may reap small positive net benefits.
Kluve, J. (2010).	OECD countries	The article states that, rather than contextual factors such as labour market institutions or the business cycle, it is almost exclusively the programme type that seems to matter for programme effectiveness. While direct employment programmes in the public sector frequently appear detrimental, wage subsidies and "Services and Sanctions" can be effective in increasing participants' employment probability.
Card, D., Kluve, J., & Weber, A. (2015).	Whole world	1) Average impacts of ALMP are close to zero in the short run, but become more positive 2-3 years after completion of the programme; (2) the time profile of impacts varies by type of programme, with larger gains for programmes that emphasize human capital accumulation; (3) there is systematic heterogeneity across participant groups, with larger impacts for females and participants who enter from long term unemployment; (4) active labour market programmes are more likely to show positive impacts in a recession.

Liu, S., Huang, J. L., & Wang, M. (2014).	Not specified	Job search interventions that contain certain components, including teaching job search skills, improving selfpresentation, boosting self-efficacy, encouraging proactivity, promoting goal setting, and enlisting social support, are more effective than interventions that did not include such components. More important, job search interventions effectively promoted employment only when both skill development and motivation enhancement are included.
Dar, A., & Tzannatos, Z. (1999)	OECD countries	ALMPS 1) help disadvantaged groups providing poverty/safety nets, but ineffective instruments in the pursue of permanent employment 2) can have positive impacts an be cost-effective but in general does not seem to improve quality of employment type and duration of contract, nor wages 3) Helpful under an improving economy 4) more expensive and ineffective than job search assistance 5) no positive impact on employment prospects. they cannot be a substitute to education systems failures 6) displacement effects, unlikely to have positive impacts.
Nightingale, D. S., & Holcomb, P. A. (1997).	U.S.	ALMPS increase employment and earnings in some cases. Alsp reduction of welfare costs but in general only small gains in earnings that do not move most participants out of poverty.
Walk, M., Greenspan, I., Crossley, H., & Handy, F. (2015).	Canada	Clients evaluation of the impact of job-training and skills-building programmes. Findings illuminating the gap between expectations and actual experiences. Necessity of calibrating expectations when entering the programme and preparing to possible difficulties in the transitional period when facing with actual search of job. Importance of drawing participant's attention on by products of the programme. Self-improvement, nets of friendships and supports.
Eppel, R., Horvath, T., & Mahringer, H. (2014).	Austria	Transitional employment in socio-economic enterprises, non-profit employment projects, training and socio-pedagogical support to unemployed job-seekers are examined. Significant improvements of labour force participation and of individuals' employment prospects (women and older workers in particular) are found.
Ragazzi, E., & Sella, L. (2013)	Italy piedmont	The article examines employment rates of participants to vocational training courses targeting adults and young people. Employment rate of participants between 38,0% and 42,5% with the odds of 95% , programme completion rate between 44,4% and 49,0%. Best outcomes concern adults with low educational level notably for programme preparing for medical care and social and long term care sector.

Age stereotypes and employment		
Authors	**Geographical coverage**	**Summary**
Dordoni, P., & Argentero, P. (2015).	Europe and U.S.	The main findings of selected empirical studies indicated that: a) there is the need to focus on management policies for older workers; b) age stereotypes toward older workers are multidimensional and there is the simultaneous existence of both positive and negative stereotypical beliefs; c) managers' age stereotypes can affect several organizational outcomes. Self-categorization theory and intergroup bias are recommended as promising theoretical approaches for studying age stereotypes toward older workers and their cognitive identification with the age group.
Graduated unemployment		
Authors	**Geographical coverage**	**Summary**
Scurry, T., & Blenkinsopp, J. (2011)	Area a not specified	The review highlights significant issues around the conceptualisation and measurement of graduate under-employment. It argues that individual volition and meaning making are important issues that to date remain under-researched in relation to graduate under-employment.
Unemployment insurance (UI)		
Authors	**Geographical coverage**	**Summary**
O'Campo, P., Molnar, A., Ng, E., Renahy, E., Mitchell, C., Shankardass, K., & Muntaner, C. (2015).	EU countries	Poverty and psychological distress, among unemployed and even the employed, are impacted by generosity of UI in terms of eligibility, duration and wage replacement levels. Though unemployment benefits are not intended to compensate fully for a loss of earnings, generous UI programmes can moderate harmful consequences of unemployment.

Wage subsidies/Wage tax exemption for firms hiring part of their workforce locally		
Authors	**Geographical coverage**	**Summary**
Gobillon, L., Magnac, T., & Selod, H. (2012).	France	The article focuses on French enterprise zone programme: wage-tax exemption (about one third of total labour costs) to firms hiring at least 20% of their labour force locally. Effects on unemployment duration, distinguishing between short- and medium-term effects are discussed. Results: small effect on the rate at which unemployed workers find a job (increased by a modest 3%). effect localised and significant only in the short run (3 years following the start of the policy). Cost-ineffective
Eppel, R. & Mahringer, H. (2012).	Austria	Wage subsidies schemes granted temporarily to employers who decide to recruit from particular groups of unemployed individuals aged 25-54 are examined. Results: Significant increase in employment for supported job seekers compared to similar non participants in the seven years from programme start. Considerably less time spent in unemployment and out of the labour force. Programme effectivity increases with age and pre-treatment employment duration. Remarkable for older worker and long term unemployment. Participation has no significant impact on average wage level but there is a rise in cumulated earnings due to increase in employment. Wage subsidy seems therefore particularly effective in helping disadvantaged individuals back into employment.
Youth training programmes		
Authors	**Geographical coverage**	**Summary**
Betcherman, G., Godfrey, M., Puerto, S., Rother, F., & Stavreska, A. (2007)	42 from OECD countries; 24 per cent Latin America, 14 per cent in Eastern Europe and Central Asia, 10 per cent in SubSaharan Africa, 7 per cent in South and East Asia and the Pacific, 3 per cent in the Middle East and North Africa.	Employment impact of youth interventions tends to be more favorable in developing and transition countries than in industrialized countries. The meta-analysis confirmed that the difference in programme impact by level of development remained even after the quality of the evaluation evidence was taken into account.

Kluve, J., Puerto, S., Robalino, D., Romero, J. M., Rother, F., Stöterau, J., Weidenkaff, F., & Witte, M. (2016).	OECD 52%, Sub-Sahara Africa14%, Europe and Central Asia 4% Latin America and Caribbean 21%, Middle East and North Africa 6%, South Asia 4%	Just more than one-third of evaluation results from youth employment programmes implemented worldwide show a significant positive impact on labour market outcomes – either employment rates or earnings. In general, programmes have been more successful in middle- and low-income countries; this may be because these programmes' investments are especially helpful for the most vulnerable population groups – low-skilled, low-income – that they target.
Ibarraran, P., Kluve, J., Ripani, L., & Rosas, D. (2015).	Santo Domingo	The long-term analysis shows that impacts of the programme examined are sustained and growing over time. There are no impacts on average employment, which is consistent with the low unemployment in countries with high informality and no unemployment insurance. Looking at the local labour market context, the analysis suggests that skills training programmes work particularly well in more dynamic local contexts, where there is actual demand for the skills provided.
Díaz, J. J., & Rosas Shady, D. (2016).	Perú	This paper evaluates the impact of The Peruvian Job Youth Training Programme (Projoven). The evaluation finds a high long term positive impact of Projoven on formal employment. It also finds certain heterogeneity of programme impacts across subpopulations. Impacts on formal employment vary depending on the beneficiaries' gender and age, with different patterns of statistical significance depending on the data source used to measure employment formality. Finally, it does not find significant impacts on socio-emotional skills.
Women's employability		
Todd, P. E. (2012)	Non OECD countries, developing and transition economies Latin america Asia Africa	The article evaluate various labour market programmes, education and training programmes, programmes that facilitate work (childcare subsidies, parental leave programmes and land titling programmes), microfinance programmes, entrepreneurship and leadership programmes. Results: many programmes effective in increasing women's quantity of work as measured by increased rates of labour market participation and number of hours worked. In some cases, the programmes also increased women's quality of work, for example, by increasing the capacity for women to work in the formal rather than the informal sector.

Table 12: Systematic review – Social inclusion

Authors	Geographical coverage	Summary
Seyfang, G. (2003).	England	'Time banks' are a new form of community currency in the UK which are receiving government support. Time credits are earned for each hour of voluntary service given, and can be used to purchase services from other members in return. This article discusses new findings from the first national study of time banks to assess their impacts and potential. Time banks are found to be successful at engaging socially excluded and vulnerable groups of people in community activities - many for the first time - boosting their confidence, social networks, skills and well-being.
Misuraca, G., Centeno, C., & Torrecillas, C. (2014).	EU	The text presents both a conceptual model and an operational framework with guidelines for self-evaluation of practices, with specific regard to interventions addressed to the use of ICTs to enhance employability of groups at risk of exclusion.
Das, Maitreyi B. (2016).	Not specified	This study used systematic review methods to synthesise evidence in three main areas: (i) how people with LTC or disabilities and their family carers find and access information about the quality of services; (ii) how quality information is used in decision-making; and (iii) what type of quality information is most useful.

Table 13: Systematic review – Long-term care

Authors	Geographical coverage	Summary
Makai, P., Brouwer, W. B. F., Koopmanschap, M. A., Stolk, E. A., & Nieboer, A. P. (2014)	Not specified	The review identifies four well wellbeing instruments for inclusion in economic evaluation and recommend the use of ICECAP-O and ASCOT
Da Roit, B., & Le Bihan, B. (2010)	Austria, France, Germany, Italy, the Netherlands, and Sweden	A new typology of long-term care configurations is proposed based on the inclusiveness of the system, the role of cash-for-care schemes and their specific regulations, as well as the views of informal care and the care work that they require.
Turnpenny, A., & Beadle-Brown, J. (2014).	UK	The analysis highlights the use of multiple sources of information in decision-making about services and in particular the importance of informal sources and extended social networks in accessing information. . Trust emerged a key issue in relation to quality information. Experiential and subjective information is highly valued and trusted.
Scott, J. C., & Elstein, P. (2004).	U. S.	This article presents a descriptive, conceptual discussion of strategic issues and a summary of research that would be valuable in informing critical areas of decision-making in quality and outcomes research in long term care over the next decade. The issues, dilemmas, and challenges discussed are grouped into 5 categories: measurement methods and tools, uses of quality data, organizational and cultural factors, information and informatics, and impact evaluation and research.
Vassilev, I., Rogers, A., Blickem, C., Brooks, H., Kapadia, D., Kennedy, A., & Reeves, D. (2013).	North West of England	The article analysis the use of networks for illness management. Survey conducted on 300 people from deprived areas and with chronic illnesses. A network perspective offers an opportunity to redress the balance of an exclusively individual focus on self-management because it addresses the broader set of contributions and resources available to people in need of chronic illness management and support.

Annex VI – Review of relevant statistics and datasets

The following table lists the statistical databases reviewed during the i-FRAME 2.0 revision.

Table 14: Relevant statistics and datasets

Source	Theme	Database
OECD	Protection and Well-being	Social Protection (Social Expenditure Aggregated data; Detailed data; Reference Series; Pensions at a Glance; ELS Pensions; Income distribution and poverty) Wealth Benefits, Taxes and Wages (Key Indicators; TAXBEN Data Visualisation; Benefits, Taxes and Wages – Net Incomes) Gender (Gender, Institutions and Development Database; Education; Entrepreneurship; Employment) Family Child Well-Being
	Science, Technology and Patents	OECD Science Technology and Industry Outlook Patents Statistics Research and Development Statistics Science and Technology Indicators
	ICT	ICT Access and Usage by Households and Individuals ICT Access and Use by Businesses
	Labour	Earnings Employment Protection Labour Force Statistics Labour Market Programmes Trade Union World Indicators of Skills for Employment ILOSTAT Database Job quality
Eurostat	Digital economy and society (t_isoc)	ICT usage in households and by individuals (t_isoc_i) ICT usage in enterprises (t_isoc_e) Digital skills (t_isoc_sk) ICT sector (t_isoc_se)
	Science and technology (t_scitech)	Research and development (t_research) Community innovation survey (t_inn) High-tech industry and knowledge-intensive services (t_htec) Human Resources in Science & Technology (t_hrst) Intellectual property rights (t_ipr)
	Quality of Life (QOL)	Material living conditions Productive or main activity Health Education Leisure and social interactions Economic and physical safety Governance and basic rights Natural and living environment Overall experience of life Classes of indicators
	Social protection	Social protection (t_spr) Expenditure on social protection (tps00098) Total expenditure on social protection per head of population. ECU/EUR (tps00099) Expenditure on social protection per inhabitant (tps00100) Total expenditure on social protection by type (tps00101) Total expenditure on social benefits (tps00102) Total expenditure on administration costs (tps00104) Other expenditure on social protection (tps00105) Social benefits by function - % of total benefits (tps00106)

		Social benefits by function - million EUR (tps00082) Net social benefits by function (tps00083) Social benefits per head of population by function (tps00107) Expenditure on pensions (tps00103) Expenditure on care for elderly (tsdde530) Social protection receipts by type (tps00108)
	Income, social inclusion and living conditions	Income and living conditions (t_ilc) People at risk of poverty or social exclusion (Europe 2020 strategy) (t_ilc_pe) Income distribution and monetary poverty (t_ilc_ip) Living conditions (t_ilc_lv) Material deprivation (t_ilc_md)
	Labour Market Policy	Labour market policy (source: DG EMPL) (t_lmp) Public expenditure on labour market policies, by type of action (source: DG EMPL) (tps00076) Public expenditure on labour market policy measures, by type of action (source: DG EMPL) (tps00077) Public expenditure on labour market policy supports, by type of action (source: DG EMPL) (tps00078) Participants in labour market policy measures, by type of action (source: DG EMPL) (tps00079) Beneficiaries of labour market policy supports, by type of action (source: DG EMPL) (tps00080) Persons registered with Public Employment Services (source: DG EMPL) (tps00081)
United Nations	Social Indicators	Population Health Housing Education Work

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